

#713

Dynamics Explorer 2  
Magnetometer Data (MAGB)  
81-070B-01C

Dynamcis Explorer 2  
LANG Software Tape  
81-070B-09C

Dynamics Explorer 2  
LANG Data  
81-070B-09D

Dynamics Explorer 2

Magnetic Fields

Magnetometer Data (Mag-B)

81-070B-01C

The Mag-B data set is written on 3 Optimem optical disks using SOAR Version 4.2. The documentation is on each disk in the VOLDESC.SFD and FORMAT.SFD files. The directory listings have been included on the following pages. The KV numbers, label names and time spans follow:

KV #	Label	Time Span
KV00026	side 1 deb1_0001a	08/15/81 - 10/12/81
	side 2 deb1_0001b	10/13/81 - 11/17/81
KV00027	side 1 deb1_0002a	11/18/81 - 07/29/82
	side 2 deb1_0002b	07/30/82 - 10/08/82
KV00028	side 1 deb1_0003a	10/09/82 - 02/16/83
	side 2 deb1_0003b	no data on side b

The DE-B magnetometer instrument's archive file contains one day of measured magnetic field vectors in space craft coordinates (x,y,z). The filename contains year and day information and each record is fixed length 4 (32 bit) words long.

(Note: While all files should be in VAX 'fixed length' form, for historical reasons one or two may be encountered as VAX 'variable length' form.)

#### File Name:

DYYDDD.dat (Ex. D81001.dat)

YY - Last two digits of the year (Ex. 1981 = 81)  
 DDD - Day of year three digits (Ex. 001)

#### Record Format:

TIME, X, Y, Z

s.t.

TIME - Tents of milliseconds of day	I*4
X - X component of the magnetic field vector (nT)	R*4
Y - Y component of the magnetic field vector (nT)	R*4
Z - Z component of the magnetic field vector (nT)	R*4

#### Sample FORTRAN open and read

```

integer*4 time
real*4 x
real*4 y
real*4 z
c
open (unit=20,file=daily_file,recl=4 status='old',
      access='sequential',recordtype='fixed',
      form='unformatted',iostat=istat,readonly)
c
if (istat.ne.0) then
c
open (unit=20,file=daily_file,recl=4 status='old',
      access='sequential',
      form='unformatted',iostat=istat,readonly)
c
end if
c
do while (istat.eq.0)
  read (unit=20,iostat=istat) time,x,y,z
c
end do
c

```

#### Exception:

Some files were created with variable length records. Note "if" statement used in the FORTRAN code snapshot above.

Use the following information to convert space craft data vectors into other geophysical coordinate systems. These transforms require the measured space craft vectors as well as data available from the DE O/A data base. These

O/A parameters can be obtained using a program called OAREAD. This program and corresponding data set are expected to be available from the NSSDC archive.

## DE MAGNETOMETER DATA PROCESSING

[Matrix]

<Matrix> is the matrix inverse, interchange rows and columns

PI\_2 = 1.570796327

GST	-	Greenwich Sidereal Time	O/A Parameter [16]
Pgei	-	GEI position vector	O/A Parameter [23,24,25]
Pgm	-	Geomagnetic Cartesian position vector	[R]*[J]*Pgei
Pgg	-	Geographic Cartesian position vector	[J]*Pgei
THgm	-	Geographic colatitude of the north geomagnetic dipole	0.1954769 radians
PHgm	-	Geographic longitude of the north geomagnetic dipole	5.0483649 radians
LNGgg	-	East Geographic longitude of the satellite	arctan2(Pggy,Pggx)
CLTgg	-	Geographic Colatitude of the satellite	PI_2 - arctan(Pggz/sqrt(Pggx**2+Pggy**2))
LNGgm	-	Geomagnetic longitude of the satellite	arctan2(Pgmy,Pgmx)
CLTgm	-	Geomagnetic Colatitude of the satellite	PI_2 - arctan(Pgmz/sqrt(Pgmx**2+Pgmy**2))
Bspc	-	Magnetic Field in S/C coordinates	[T]*Bspc
Bgei	-	Magnetic Field in GEI coordinates	<Kgg>*[J]*Bgei
Bggs	-	Magnetic Field in GGS coordinates	<Kgm>*[R]*[J]*Bgei
Bgms	-	Magnetic Field in GMS coordinates	O/A Parameter [42,43,44]
Mgei	-	Magnetic Field Model in GEI coordinates	<T>*Mgei
Mspc	-	Magnetic Field Model in S/C coordinates	<Kgg>*[J]*Mgei
Mggs	-	Magnetic Field Model in GGS coordinates	<Kgm>*[R]*[J]*Mgei
Mgms	-	Magnetic Field Model in GMS coordinates	
B	-	Magnitude of the magnetic field	sqrt(Bggsr**2 + Bggsth**2 + Bggspf**2)
D	-	Declination of the magnetic field	arctan2(Bggspf,-Bggsth)
I	-	Inclination of the magnetic field	arctan((-Bggsr)/sqrt(Bggsth**2+Bggspf**2))
DBgei	-	Delta magnetic field in GEI coordinates	Bgei - Mgei
DBggs	-	Delta Magnetic Field in GGS coordinates	Bggs - Mggs
DBgms	-	Delta Magnetic Field in GMS coordinates	Bgms - Mgms
DBspc	-	Delta Magnetic Field in S/C coordinates	Bspc - Mspc

-[T] matrix transform from SPC to GEI coordinates

[59]	[62]	[65]	O/A parameters
[60]	[63]	[66]	
[61]	[64]	[67]	

[J] matrix transforms from GEI to GG

-			GST O/A parameter [16]
cos(GST)	sin(GST)	0	
-sin(GST)	cos(GST)	0	

III

0 0 1

[R] matrix transforms from GG to GM

$$\begin{matrix} \cos(\text{THgm})\times\cos(\text{PHgm}) & \cos(\text{THgm})\times\sin(\text{PHgm}) & -\sin(\text{THgm}) \\ -\sin(\text{PHgm}) & \cos(\text{PHgm}) & 0 \\ \sin(\text{THgm})\times\cos(\text{PHgm}) & \sin(\text{THgm})\times\sin(\text{PHgm}) & \cos(\text{THgm}) \end{matrix}$$

[Ki] matrix Transforms spherical to cartesian coordinates  
(GG to GMS or GM to GMS)

$$\begin{matrix} \sin(\text{CLTi})\times\cos(\text{LNGi}) & \cos(\text{CLTi})\times\cos(\text{LNGi}) & -\sin(\text{LNGi}) \\ \sin(\text{CLTi})\times\sin(\text{LNGi}) & \cos(\text{CLTi})\times\sin(\text{LNGi}) & \cos(\text{LNGi}) \\ \cos(\text{CLTi}) & -\sin(\text{CLTi}) & 0 \end{matrix}$$

i = gg, gm

III

CCSDXZLM0001SMRK001CCSDXVN0002SMRK0001  
LOG\_VOL\_IDENT: USANASANSDEB1-0001A  
LOG\_VOL\_INITIATION\_DATE: 1989-08-04  
LOG\_VOL\_CLOSING\_DATE: 1992-03-12  
VOLUME\_DIAMETER: 12 INCHES  
LOG\_VOL\_CAPACITY: 1 GB/LOGICAL\_VOL  
LOG\_VOL\_FILE\_STRUCTURE: FILES-11  
VOLUME\_DRIVE\_MFGR\_AND\_MODEL: OPTIMUM 1000M WITH 1.6 CONTROLLER  
COMPUTER\_MFGR: DIGITAL EQUIPMENT CORPORATION  
OPERATING\_SYSTEM: MICROVMS 4.4  
COMPUTER\_SYSTEM: MICRO VAX II  
TECHNICAL\_CONTACT: JAMES B. BYRNES  
CODE 694  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
GODDARD SPACE FLIGHT CENTER  
GREENBELT, MD 20771  
SPAN LEPVAX::U4JBB  
PHONE 301-286-3076  
TRANSFER\_SOFTWARE: SOAR 4.0  
PREV\_VOL\_IDENT: NONE  
CCSDXVN0002EMRK0001CCSDXSNM0002SMRK0003  
DATA\_SOURCES: DYNAMICS EXPLORER B, MAGNETOMETER INSTRUMENT  
SCIENTIFIC\_CONTACT: DR. JAMES A. SLAVIN  
CODE 696  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
GODDARD SPACE FLIGHT CENTER  
SPAN DE696::U6JAS  
PHONE 301-286-5839

DESCRIPTION\_OF\_SPACECRAFT:

The Dynamics Explorer 2 spacecraft was one of two satellites in the Dynamics Explorer program. The two spacecraft were launched together into coplanar polar orbits for the purpose of studying coupling between the magnetosphere, ionosphere, and the atmosphere. The DE-2 spacecraft was placed in a low altitude orbit whereas the DE-1 orbit was highly elliptical. Instruments aboard the DE-2 spacecraft were: magnetometer(MAG-B), vector electric field instrument(VEFI), neutral atmosphere composition spectrometer (NACS), wind and temperature spectrometer(WATS), Fabry-Perot interferometer (FPI), ion drift meter(IDM), retarding potential analyzer(RPA), low altitude plasma instrument(LAPI), and Langmuir probe(LANG).

ORBIT\_INFORMATION:

Because the Delta launch vehicle did not complete a full burn, the DE-2 satellite was placed in a lower than anticipated polar orbit, initially 1012 by 309 km. The orbital period was 98 min. The DE-1 and DE-2 satellites were launched by the same vehicle so that their orbits would be coplanar, allowing two-point measurements along magnetic field lines. The DE-2 spacecraft was normally nadir oriented (i.e. one side always pointing toward the center of the earth). However, the effects of the attitude anomalies and nutation (i.e. period about 30s) are occasionally present in the magnetometer data.

-PERFORMANCE:

The DE-2 spacecraft performed well throughout its lifetime. Available power limited the instrument duty cycle to an average of thirty percent. The lifetime of the spacecraft was shorter than anticipated because of the less than nominal performance of the launch vehicle. DE-2 was launched on Aug. 3, 1981 and reentered the atmosphere on Feb. 19, 1983. (Final data pass on Feb. 18, 1983).

-TIME\_SPAN\_OF\_THE\_DATA: 15-AUG-81 TO 16-FEB-83

-INVESTIGATION\_OBJECTIVES:

The study of field-aligned currents using the DE-1 and DE-2 magnetic field measurements was the primary objective of the magnetometer investigation

(e.g., Sugiura et al., GRL, 9, 985, 1982). Comparison of the magnetometer data with measurements of precipitating charged particles yielded information on the current carriers (e.g., Marshall et al., JGR, 93, 14542, 1988). Combined with the electric field measurements and ionospheric conductivity distributions deduced from the particle measurements, the magnetometer data allowed the construction of global models for ionospheric and field-aligned currents. The combination of field-aligned current measurements and neutral atmosphere observations provided an opportunity for investigating atmosphere-magnetosphere coupling and assessing the total rate of energy transfer into the upper atmosphere.

#### INSTRUMENT\_ATTRIBUTES:

##### A. DESCRIPTION\_OF\_INSTRUMENT:

The DE magnetometers utilize triaxial fluxgate sensors. When a saturable core immersed in an ambient magnetic field is driven into alternating positive and negative saturation, a flux component at the second harmonic of the drive frequency is induced by the ambient field. This signal, which is proportional to the magnitude of the field, is synchronously detected, integrated, and fed back to the sensing coil, wound solenoidally about the core sample. The coil axis defines the direction of sensitivity for that magnetic axis and the field generated by the feedback current nulls the ambient field in that direction. A closed loop system is formed in which the sensitivity and stability are determined primarily by the value and stability of the feedback transfer function, which includes a voltage-to-current transducer and the solenoidal coil constant.

##### ELECTRONICS:

The dynamic range of each fluxgate sensor is set by the voltage controlled current source to nominally +/- 6000 nT, corresponding to an output voltage of +/- 5V. The dynamic range was extended to the +/- 62000 nT required for the DE-2 mission by a precision 4 bit digitally controlled current source which generates compensation fields in increments of nominally 8000 nT from -56000 to +56000 nT.

##### THERMAL\_CONTROL:

Even with the use of graphite fiber reinforced plastic, the sensors are weakly temperature dependent. A thermostatically controlled heater was incorporated to control the sensor temperature. The heater was driven by the spacecraft unregulated bus so that it could be left on between data acquisition periods on the power limited spacecraft.

##### B. OPERATIONAL\_MODE:

The DE-2 magnetometer possesses only a single operational mode in which the ambient field is sampled 16 times per second with a digital resolution of +/- 1.5 nT.

##### C. MEASURED\_PARAMETERS:

BX, BY, BZ IN SENSOR COORDINATES.

##### D. PERFORMANCE\_OF\_THE\_INSTRUMENT:

Magnetometer performance was nominal throughout the life of the mission.

##### E. RESOLUTION:

Each file contains high resolution data (62.5 milliseconds data).

#### PARAMETERS:

- The daily data files contains four words: universal time, BX, BY, and BZ in spacecraft (SPC) coordinates.

#### DATA\_SET\_QUALITY:

Data set quality is excellent (e.g. Langel et al., JGG, 40, 1103, 1988). However, care must be taken to avoid misinterpretation of field direction variations due to spacecraft attitude errors and nutation.

#### DATA\_PROCESSING\_OVERVIEW:

##### A. DATA\_PROCESS\_CYCLE:

- DE-2 magnetometer data was processed using instrument calibration constants and attitude transfer matrices determined prior to launch.

##### B. HISTORY:

FINAL DE-2 MAGNETOMETER CALIBRATED DAILY DATA FILES WERE ASSEMBLED IN 1989.

**DATA\_USAGE:**  
DE-2 magnetometer data has been used to measure field-aligned current densities (Sugiura et al., GRL, 9, 985, 1982) and model the geomagnetic field (Langel et al., JGG, 40, 1103, 1988).

**DATA\_ORGANIZATION:**  
Flat files containing time-tagged (i.e. tenth of milliseconds of day) magnetic field vectors at 62.5 msec resolution.

**DATA\_SET\_NAME:** DAILY DATA FILES

**CCSDXSNM0002EMRK0003CCSDXKNM0002SMRK0005**

**LOG\_VOL\_TIME\_COVERAGE:** 1981-08-13 TO 1981-10-10

**TYPE\_OF\_FILE\_TIME\_COVERAGE:** Spacecraft coordinates daily files only  
1981-08-13T00:00:00 TO 1981-10-10T23:59:59

**NAMING\_CONVENTION:**  
Each daily file contains one full day's data. The date of the data is the name of the file. For example, file:D81286.DAT contains all the values for year:1981, day:286.

**FILE\_NAME\_LIST:**

D81227.DAT;1	D81228.DAT;1	D81229.DAT;1	D81230.DAT;1
D81231.DAT;1	D81232.DAT;1	D81233.DAT;1	D81234.DAT;1
D81235.DAT;1	D81236.DAT;1	D81237.DAT;1	D81238.DAT;1
D81239.DAT;1	D81240.DAT;1	D81241.DAT;1	D81247.DAT;1
D81248.DAT;1	D81249.DAT;1	D81250.DAT;1	D81251.DAT;1
D81252.DAT;1	D81253.DAT;1	D81254.DAT;1	D81255.DAT;1
D81256.DAT;1	D81257.DAT;1	D81258.DAT;1	D81259.DAT;1
D81260.DAT;1	D81261.DAT;1	D81262.DAT;1	D81263.DAT;1
D81264.DAT;1	D81265.DAT;1	D81266.DAT;1	D81267.DAT;1
D81268.DAT;1	D81269.DAT;1	D81270.DAT;1	D81271.DAT;1
D81272.DAT;1	D81273.DAT;1	D81274.DAT;1	D81275.DAT;1
D81276.DAT;1	D81277.DAT;1	D81278.DAT;1	D81279.DAT;1
D81280.DAT;1	D81281.DAT;1	D81282.DAT;1	D81283.DAT;1
D81284.DAT;1	D81285.DAT;1		

**PREV\_LOG\_VOL\_COVERAGE:** NONE

**CCSDXKNM0002EMRK0005CCSDXRNM0003SMRK0006**

**NESTING = L**

**REF = FORMAT.SFD**

**CCSDXRNM0003EMRK0006CCSDXRLM0003SMRK0007**

**ADI = NSSD0073**

**CLASS = I**

**NESTING = N**

**SCOPE = EACH**

**REF = [DATA]DX.DAT;x**

**CCSDXRLM0003EMRK0007CCSDXRLM0003SMRK0008**

**ADI = CCSO0002**

**CLASS = S**

**NESTING = N**

**SCOPE = EACH**

**REF = READ\_ME\_FIRST.DAT**

**CCSDXRLM0003EMRK0008CCSDXZLM0001EMARK001**

## FORMAT.SFD

CCSDYDNM000200NSSD0073SMRK0001  
TYPE\_OF\_FILE NAME: Spacecraft coordinate daily data file.  
FILE\_ATTRIBUTES: Fixed length, unformatted, sequential file.

TYPE\_OF\_FILE DESCRIPTION:  
Each file contains all the data for one entire day. Each record of this  
daily data file contains a time tagged magnetic field vector in spacecraft  
coordinates.

RECORD\_LENGTH: 4 words

FILE\_STRUCTURE:  
Daily files are written as VAX unformatted sequential with logical records of  
equal length.

FORMAT\_OF\_THE\_DATA\_RECORD:

WORD NUMBER	CONTENT	TYPE I/R	VALUE RANGE	COMMENTS
1	TIME	VI	0 - 864000000	universal time of day in units of tenths of a millisecond
2	BX SPACECRAFT COORDINATES	VR	+/- 62,000	nanotesla
3	BY SPACECRAFT COORDINATES	VR	+/- 62,000	nanotesla
4	BZ SPACECRAFT COORDINATES	VR	+/- 62,000	nanotesla

FORMAT\_APPLY\_SCOPE: This format applies to all the files under the [DATA] sub-directory.

UTILITY\_TO\_PRINT\_AND\_DISPLAY\_THE\_DATA: The utility is included in the  
UTILITY\_FOR\_file in the root\_directory.

UTILITY\_APPLY\_SCOPE: This utility applies to all the files under the [DATA]  
subdirectory.

CCSDYDNM000200NSSD0073SMRK0001

CCSDXZLM0001SMARK001CCSDXVNMO0002SMRK0001

LOG-VOL IDENT: USANASANSDDDEB1-0001A  
LOG-VOL INITIATION DATE: 1989-08-04

LOG-VOL CLOSING DATE: 1992-03-12  
VOLUME-DIAMETER: 12 INCHES

LOG-VOL CAPACITY: 1 GB/LOGICAL VOL

LOG-VOL FILE-STRUCTURE: FILES-11

VOLUME-DRIVE-MFGR AND MODEL: OPTIMUM 1000M WITH 1.6 CONTROLLER

COMPUTER-MFGR: DIGITAL EQUIPMENT CORPORATION

OPERATING SYSTEM: MICROVMS 4.4

TECHNICAL-CONTACT: JAMES B. BYRNES

CODE 694

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GODDARD SPACE FLIGHT CENTER

GREENBELT, MD 20771

SPAN LEPVAX:U4JBB

PHONE 301-286-3076

TRANSFER-SOFTWARE: SOAR 4.0

PREV VOL IDENT: NONE

CCSDXVNMO002EMRK0001CCSDXNM0002SMRK0003

DATA-SOURCES: DYNAMICS EXPLORER B, MAGNETOMETER INSTRUMENT

SCIENTIFIC-CONTACT: DR. JAMES A. SLAVIN

CODE 696

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GODDARD SPACE FLIGHT CENTER

SPAN DE696:U6JAS

PHONE 301-286-5839

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**DATA\_SET\_NAME: DAILY DATA FILES****CCSDXRNMM0003EMRK0003CSDXRNMM0003SMRK0005****LOG VOL TIME COVERAGE: 1981-08-13 TO 1981-10-10****TYPE\_OF\_FILE TIME\_COVERAGE: Spacecraft coordinates daily files only****1981-08-13T00:00:00 TO 1981-10-10T23:59:59****NAMING CONVENTION:**

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**FILE NAME LIST:**

D81227.DAT;1	D81228.DAT;1	D81229.DAT;1	D81230.DAT;1
D81231.DAT;1	D81232.DAT;1	D81233.DAT;1	D81234.DAT;1
D81235.DAT;1	D81236.DAT;1	D81237.DAT;1	D81238.DAT;1
D81239.DAT;1	D81240.DAT;1	D81241.DAT;1	D81247.DAT;1
D81248.DAT;1	D81249.DAT;1	D81250.DAT;1	D81251.DAT;1
D81252.DAT;1	D81253.DAT;1	D81254.DAT;1	D81255.DAT;1
D81256.DAT;1	D81257.DAT;1	D81258.DAT;1	D81259.DAT;1
D81260.DAT;1	D81261.DAT;1	D81262.DAT;1	D81263.DAT;1
D81264.DAT;1	D81265.DAT;1	D81266.DAT;1	D81267.DAT;1
D81268.DAT;1	D81269.DAT;1	D81270.DAT;1	D81271.DAT;1
D81272.DAT;1	D81273.DAT;1	D81274.DAT;1	D81275.DAT;1
D81276.DAT;1	D81277.DAT;1	D81278.DAT;1	D81279.DAT;1
D81280.DAT;1	D81281.DAT;1	D81282.DAT;1	D81283.DAT;1
D81284.DAT;1	D81285.DAT;1		

**PREV\_LOG VOL COVERAGE: NONE****CCSDXRNMM0002EMRK0005CSDXRNMM0003SMRK0006****NESTING = L****REF = FORMAT.SFD****CCSDXRNMM0003EMRK0006CSDXRLM0003SMRK0007****ADI = NSSD0073****CLASS = I****NESTING = N****SCOPE = EACH****REF = [DATAID\*.DAT]\*****CCSDXRLM0003EMRK0007CSDXRLM0003SMRK0008****ADI = CCSDD002****CLASS = S****NESTING = N****SCOPE = EACH****REF = READ\_ME FIRST.DAT****CCSDXRLM0003EMRK0008CSDXZLM0001EMARK001**

# DEB1.00001A

Directory \$1#05A2:10000001

```
000000.DIR;1          29-MAY-1992 14:14:18.21
BACKUP.SYS;1          29-MAY-1992 14:14:18.21
BADBLK.SYS;1          29-MAY-1992 14:14:18.21
BADLOG.SYS;1          29-MAY-1992 14:14:18.21
BITMAP.SYS;1          29-MAY-1992 14:14:18.21
CONFIG.SYS;1          29-MAY-1992 14:14:18.21
CONTIN.SYS;1          29-MAY-1992 14:14:18.21
CORIMG.SYS;1          29-MAY-1992 14:14:18.21
INDEXF.SYS;1          29-MAY-1992 14:14:18.21
JUNK.DIR;1            29-MAY-1992 14:14:18.21
MAGE.DIR;1            29-MAY-1992 14:14:18.21
OSSECURE.SYS;1        29-MAY-1992 14:14:18.21
OTRANSFER.SYS;1      29-MAY-1992 14:14:18.21
VOLSET.SYS;1          29-MAY-1992 14:14:18.21
```

Total of 14 files, 348/1432 blocks.

Directory \$1#05A2:[JUNK]

```
A,A;1                  1/8           29-MAY-1992 10:57:05.79
```

Total of 1 file, 1/8 blocks.

Directory \$1#05A2:[IMAGE]

```
DATA.DIR;1             4/24          29-MAY-1992 14:14:22.03
FORMAT.SFD;1           3/8           12-MAR-1992 10:49:05.19
READ.ME.FIRST.DAT;1    11/16          12-MAR-1992 15:28:07.84
VOLDESC.SFD;1          19/24          12-MAR-1992 15:54:57.45
```

Total of 4 files, 37/72 blocks.

Directory \$1#05A2:[IMAGE, DATA]

```
D81227.DAT;4          2735/2736   6-JUL-1992 16:39:03.69
D81227.DAT;3          2735/2736   6-JUL-1992 16:39:03.69
D81227.DAT;1          0/2736     29-MAY-1992 14:19:53.17
D81228.DAT;3          4737/4744   6-JUL-1992 16:38:52.80
D81228.DAT;1          0/4744     29-MAY-1992 14:37:30.32
D81229.DAT;4          3537/3544   6-JUL-1992 16:38:45.58
D81229.DAT;1          0/3544     29-MAY-1992 14:50:46.51
D81230.DAT;3          3858/3864   6-JUL-1992 16:38:36.74
D81230.DAT;1          0/3864     29-MAY-1992 15:28:07.21
D81231.DAT;1          9522/9528   18-AUG-1989 11:07:09.30
D81232.DAT;1          9360/9360   18-AUG-1989 11:24:05.02
D81233.DAT;1          6979/6984   18-AUG-1989 11:45:18.89
D81234.DAT;1          8665/8672   18-AUG-1989 13:47:01.48
D81235.DAT;1          10113/10120  18-AUG-1989 14:05:50.45
D81236.DAT;1          8875/8880   18-AUG-1989 14:35:23.79
D81237.DAT;1          5451/5456   18-AUG-1989 14:46:56.58
D81238.DAT;1          5371/5376   18-AUG-1989 14:59:22.18
D81239.DAT;1          9944/9944   18-AUG-1989 15:36:53.10
D81240.DAT;1          9556/9560   18-AUG-1989 16:36:32.36
D81241.DAT;1          735/736    18-AUG-1989 16:48:18.34
D81247.DAT;1          5656/5656   8-SEP-1989 11:41:24.62
D81248.DAT;1          6966/6968   8-SEP-1989 11:47:45.75
D81249.DAT;1          7887/7888   8-SEP-1989 11:55:49.82
```

**D8E81 - 0001A**

File Name	Creation Date	Last Modification Date
D81250.DAT	8-SEP-1989	12:05:06.54
D81250.DAT	29-MAY-1992	17:16:10.38
D81251.DAT	0/9224	
D81252.DAT	9059/9064	8-SEP-1989 12:15:53.66
D81253.DAT	9002/9008	6-SEP-1989 11:49:58.03
D81254.DAT	6658/6664	6-SEP-1989 12:04:21.40
D81255.DAT	6466/6472	6-SEP-1989 12:16:05.78
D81256.DAT	8806/8808	6-SEP-1989 12:28:46.34
D81257.DAT	7523/7528	6-SEP-1989 12:43:26.72
D81258.DAT	7333/7336	6-SEP-1989 12:56:36.97
D81259.DAT	5517/5520	6-SEP-1989 13:08:41.17
D81260.DAT	8667/8672	6-SEP-1989 13:20:25.48
D81261.DAT	4377/4384	6-SEP-1989 13:33:25.27
D81262.DAT	7125/7128	6-SEP-1989 13:42:54.61
D81263.DAT	8691/8696	6-SEP-1989 16:32:27.18
D81264.DAT	11587/11592	18-SEP-1989 16:36:39.42
D81265.DAT	8362/8368	18-SEP-1989 17:00:05.97
D81266.DAT	9087/9088	15-SEP-1989 17:04:25.03
D81267.DAT	8355/8360	15-SEP-1989 17:20:49.02
D81268.DAT	9402/9408	15-SEP-1989 17:36:46.60
D81269.DAT	12014/12016	15-SEP-1989 17:55:24.43
D81269.DAT	8012/8016	15-SEP-1989 18:15:46.18
D81270.DAT	0/8016	31-MAY-1992 18:50:42.25
D81271.DAT	13596/13600	15-SEP-1989 18:33:33.61
D81272.DAT	11769/11776	15-SEP-1989 18:58:15.97
D81273.DAT	10350/10352	15-SEP-1989 19:20:00.90
D81274.DAT	10642/10648	15-SEP-1989 19:40:07.59
D81275.DAT	13235/13240	15-SEP-1989 20:01:58.54
D81276.DAT	12161/12168	15-SEP-1989 20:27:28.36
D81277.DAT	8686/8688	15-SEP-1989 20:49:51.29
D81278.DAT	9303/9304	15-SEP-1989 21:07:28.72
D81278.DAT	13304/13304	15-SEP-1989 21:27:56.13
D81279.DAT	13304/13304	15-SEP-1989 21:27:56.13
D81280.DAT	11412/11416	15-SEP-1989 21:53:44.61
D81281.DAT	10616/10616	15-SEP-1989 22:16:27.13
D81282.DAT	14109/14112	15-SEP-1989 22:39:42.48
D81283.DAT	11211/11216	15-SEP-1989 23:07:12.46
D81284.DAT	9413/9416	15-SEP-1989 23:29:38.93
D81285.DAT	11507/11512	15-SEP-1989 23:50:23.25
	13471/13472	16-SEP-1989 00:15:22.95

Total of 62 files, 486037/518376 blocks.

Grand total of 4 directories, 81 files, 486423/519888 blocks.

Directory #1\$DUE2:[000000]

DEB1\_0001E

000000.DIR;1	1/8	1-JUN-1992	14:46:54.46
BACKUP.SYS;1	0/0	1-JUN-1992	14:46:54.46
BADBLK.SYS;1	8/8	1-JUN-1992	14:46:54.46
BADLOG.SYS;1	1/8	1-JUN-1992	14:46:54.46
BITMAP.SYS;1	63/64	1-JUN-1992	14:46:54.46
CONFIG.SYS;1	1/8	1-JUN-1992	14:46:59.48
CONTIN.SYS;1	0/0	1-JUN-1992	14:46:54.46
CORING.SYS;1	0/0	1-JUN-1992	14:46:54.46
INDEXF.SYS;1	272/272	1-JUN-1992	14:46:54.46
JUNK.DIR;1	1/24	1-JUN-1992	14:46:59.01
MAGB.DIR;1	1/8	1-JUN-1992	14:46:57.94
OSSECURE.SYS;1	0/8	1-JUN-1992	14:48:08.11
VOLSET.SYS;1	0/0	1-JUN-1992	14:46:54.46

Total of 13 files, 348/408 blocks.

Directory #1\$DUE2:[IMAGE]

DATA.DIR;1	2/24	1-JUN-1992	14:46:58.76
FORMAT.SFD;1	3/8	12-MAR-1992	10:49:05.19
READ.ME-FIRST.DAT;1	11/16	12-MAR-1992	15:28:07.84
VOLDESC.SFD;5	20/24	12-MAR-1992	14:24:57.41

Total of 4 files, 36/72 blocks.

Directory #1\$DUE2:[IMAGE.DATA]

D81286.DAT;2	11520/11520	16-MAY-1990	14:07:56.23
D81287.DAT;1	11520/11520	16-MAY-1990	14:07:56.23
D81288.DAT;1	11960/11960	16-MAY-1990	14:19:59.83
D81289.DAT;1	10378/10384	16-MAY-1990	14:45:07.76
D81290.DAT;1	11811/11816	18-MAY-1990	15:14:19.50
D81291.DAT;1	11813/11836	18-MAY-1990	15:40:14.11
D81292.DAT;1	10518/10520	16-MAY-1990	15:11:40.92
D81293.DAT;1	14320/14320	16-MAY-1990	15:32:16.57
D81294.DAT;1	15212/15216	18-MAY-1990	16:14:15.99
D81295.DAT;1	15163/15168	16-MAY-1990	16:12:45.67
D81296.DAT;1	14801/14808	16-MAY-1990	16:41:40.91
D81297.DAT;1	13612/13616	16-MAY-1990	17:12:10.12
D81298.DAT;1	12765/12768	16-MAY-1990	17:36:04.22
D81299.DAT;1	11174/11176	16-MAY-1990	17:58:41.39
D81300.DAT;1	11967/11968	16-MAY-1990	18:19:34.21
D81301.DAT;1	14802/14804	17-MAY-1990	09:37:56.58
D81302.DAT;1	12952/12952	17-MAY-1990	04:06:03.56
D81303.DAT;1	11137/11144	17-MAY-1990	04:30:03.07
D81304.DAT;1	11492/11496	17-MAY-1990	06:20:05.95
D81305.DAT;1	12985/12992	17-MAY-1990	06:45:08.71
D81306.DAT;1	13506/13512	17-MAY-1990	04:53:16.22
D81307.DAT;1	14022/14024	17-MAY-1990	05:17:11.01
D81308.DAT;1	9314/9320	17-MAY-1990	05:40:02.09
D81309.DAT;1	12045/12048	17-MAY-1990	07:27:23.17
D81310.DAT;1	13861/13864	17-MAY-1990	07:51:57.87
D81311.DAT;1	12323/12328	17-MAY-1990	08:18:38.32
D81312.DAT;1	11712/11712	17-MAY-1990	08:43:44.14
D81313.DAT;1	12198/12200	17-MAY-1990	09:08:22.01

D81320.DAT:1 15783/15784 17-MAY-1990 09:35:35.81  
D81321.DAT:1 13928/13928 17-MAY-1990 10:08:44.03

Total of 32 files, 401736/401840 blocks.

Directory \$1\$DUB3:10000001 DEB1\_0002A

000000.DIR;1	1/8	7-JUN-1990 15:57:32.46
BACKUP.SYS;1	0/0	7-JUN-1990 15:57:32.46
BADBLK.SYS;1	8/8	7-JUN-1990 15:57:32.46
BADLOG.SYS;1	0/0	7-JUN-1990 15:57:32.46
BITMAP.SYS;1	63/64	7-JUN-1990 15:57:32.46
CONFIG.SYS;1	1/8	7-JUN-1990 15:57:32.46
CONTIN.SYS;1	0/0	7-JUN-1990 15:57:32.46
CDRIMG.SYS;1	0/0	7-JUN-1990 15:57:32.46
INDEXF.SYS;1	288/288	7-JUN-1990 15:57:32.46
IMAGE.DIR;1	1/8	7-JUN-1990 15:57:35.73
VOLSET.SYS;1	0/0	7-JUN-1990 15:57:32.46

Total of 11 files, 362/384 blocks.

Directory \$1\$DUB3:[IMAGE]

DATA.DIR;1	10/24	7-JUN-1990 15:57:36.56
FORMAT.SFD;2	3/8	12-MAR-1992 10:49:05.19
READ.ME-FIRST.DAT;1	11/16	17-JUN-1992 14:06:28.92
VOLDESC.SFD;11	27/32	17-JUN-1992 14:36:11.05

Total of 4 files, 51/80 blocks.

Directory \$1\$DUB3:[IMAGE.DAT]

D81322.DAT;2	15779/15784	11-JUN-1990 22:23:27.12
D81322.DAT;1	15779/15784	7-JUN-1990 19:36:10.13
D81323.DAT;2	25009/25016	11-JUN-1990 22:47:38.31
D81323.DAT;1	25009/25016	7-JUN-1990 19:58:58.90
D81324.DAT;2	11863/11864	11-JUN-1990 23:09:53.21
D81324.DAT;1	11863/11864	7-JUN-1990 20:18:53.90
D81325.DAT;2	13730/13736	11-JUN-1990 23:24:32.91
D81325.DAT;1	13730/13736	7-JUN-1990 20:32:51.77
D81326.DAT;2	14630/14632	11-JUN-1990 23:41:06.38
D81326.DAT;1	14630/14632	7-JUN-1990 20:48:20.28
D81327.DAT;2	16405/16408	11-JUN-1990 23:58:50.97
D81327.DAT;1	16405/16408	7-JUN-1990 21:05:23.38
D81328.DAT;2	14987/14992	12-JUN-1990 00:17:10.52
D81328.DAT;1	14987/14992	7-JUN-1990 21:22:39.86
D81329.DAT;2	15321/15328	12-JUN-1990 00:34:39.53
D81329.DAT;1	15321/15328	7-JUN-1990 21:39:15.18
D81330.DAT;2	15404/15408	12-JUN-1990 00:52:49.69
D81330.DAT;1	15404/15408	7-JUN-1990 21:56:18.39
D81331.DAT;2	15075/15080	12-JUN-1990 01:10:59.59
D81331.DAT;1	15075/15080	7-JUN-1990 22:13:33.60
D81332.DAT;2	15137/15144	12-JUN-1990 01:28:31.70
D81332.DAT;1	15137/15144	7-JUN-1990 22:30:57.81
D81333.DAT;2	14328/14328	12-JUN-1990 01:45:58.65
D81333.DAT;1	14328/14328	7-JUN-1990 02:48:02.91
D81334.DAT;2	15890/15896	12-JUN-1990 02:03:22.56
D81334.DAT;1	15890/15896	7-JUN-1990 23:05:36.65
D81335.DAT;2	13767/13768	12-JUN-1990 02:21:03.44
D81335.DAT;1	13767/13768	7-JUN-1990 02:23:21.78
D81336.DAT;2	13243/13248	12-JUN-1990 02:36:43.59
D81336.DAT;1	13243/13248	7-JUN-1990 02:39:34.83
D81337.DAT;1	13650/13656	8-JUN-1990 11:48:36.06
D81338.DAT;1	13939/13944	8-JUN-1990 12:05:50.46

D81339.DAT;1	14165/14168	8-JUN-1990	12:22:45.11
D81340.DAT;1	15744/15744	8-JUN-1990	12:40:39.82
D81341.DAT;1	13797/13800	8-JUN-1990	12:58:09.36
D81342.DAT;1	10931/10936	8-JUN-1990	13:13:04.66
D81343.DAT;1	14554/14560	8-JUN-1990	13:28:07.71
D81344.DAT;1	13711/13712	8-JUN-1990	13:45:02.49
D81345.DAT;1	12090/12096	8-JUN-1990	13:59:43.95
D81346.DAT;1	15071/15072	8-JUN-1990	14:14:44.23
D81347.DAT;1	14975/14976	8-JUN-1990	14:31:30.40
D81348.DAT;1	13866/13872	8-JUN-1990	14:48:38.69
D81349.DAT;1	10255/10256	8-JUN-1990	15:02:18.48
D81350.DAT;1	11686/11688	8-JUN-1990	15:14:38.87
D81351.DAT;1	13492/13496	8-JUN-1990	15:28:49.66
D81352.DAT;1	11890/11896	8-JUN-1990	15:43:41.56
D81353.DAT;1	13175/13176	8-JUN-1990	15:58:31.93
D81354.DAT;1	11537/11544	8-JUN-1990	16:13:14.86
D81355.DAT;1	12744/12744	12-JUN-1990	18:39:24.34
D81356.DAT;1	12334/12336	12-JUN-1990	18:52:51.87
D81357.DAT;1	12550/12552	12-JUN-1990	19:06:20.07
D81358.DAT;1	10348/10352	12-JUN-1990	19:18:31.54
D81359.DAT;1	7694/7696	12-JUN-1990	19:28:03.06
D81360.DAT;1	11383/11384	12-JUN-1990	19:38:31.20
D81361.DAT;1	9655/9656	12-JUN-1990	19:49:41.25
D81362.DAT;1	7479/7480	12-JUN-1990	19:58:57.04
D81363.DAT;1	11814/11816	12-JUN-1990	20:09:47.54
D81364.DAT;1	11473/11480	12-JUN-1990	20:22:26.33
D81365.DAT;1	10015/10016	12-JUN-1990	20:34:10.98
D82001.DAT;1	11296/11296	12-JUN-1990	21:12:47.58
D82002.DAT;1	10853/10856	12-JUN-1990	21:24:43.02
D82003.DAT;1	12251/12256	12-JUN-1990	21:37:21.26
D82004.DAT;1	9750/9752	12-JUN-1990	21:49:05.28
D82005.DAT;1	12396/12400	12-JUN-1990	22:01:14.02
D82006.DAT;1	8235/8240	12-JUN-1990	22:12:28.34
D82007.DAT;1	12352/12352	12-JUN-1990	22:23:53.04
D82008.DAT;1	10123/10128	12-JUN-1990	22:36:00.62
D82009.DAT;1	13151/13152	12-JUN-1990	22:48:43.01
D82010.DAT;1	10624/10624	12-JUN-1990	23:01:24.25
D82011.DAT;1	7039/7040	12-JUN-1990	23:10:57.64
D82012.DAT;1	10991/10992	12-JUN-1990	23:20:52.92
D82013.DAT;1	7605/7608	12-JUN-1990	23:30:48.52
D82014.DAT;1	11798/11800	12-JUN-1990	23:41:24.16
D82015.DAT;1	10835/10840	12-JUN-1990	23:53:33.60
D82016.DAT;1	11049/11056	13-JUN-1990	00:05:27.04
D82017.DAT;1	11952/11952	13-JUN-1990	00:17:49.99
D82018.DAT;1	11121/11128	13-JUN-1990	00:30:15.96
D82019.DAT;1	11520/11520	13-JUN-1990	00:42:33.84
D82020.DAT;1	8537/8544	13-JUN-1990	00:53:11.78
D82021.DAT;1	12047/12048	13-JUN-1990	18:10:52.08
D82022.DAT;1	8064/8064	13-JUN-1990	18:21:34.36
D82023.DAT;1	10001/10008	13-JUN-1990	18:31:30.25
D82024.DAT;1	9151/9152	13-JUN-1990	18:41:50.48
D82025.DAT;1	10589/10592	13-JUN-1990	18:52:36.80
D82026.DAT;1	13645/13648	13-JUN-1990	19:05:43.11
D82027.DAT;1	8620/8624	13-JUN-1990	19:17:31.98
D82028.DAT;1	12193/12200	13-JUN-1990	19:28:48.01
D82029.DAT;1	9573/9576	13-JUN-1990	19:40:35.71
D82030.DAT;1	11646/11648	13-JUN-1990	19:52:19.22
D82031.DAT;1	10392/10392	13-JUN-1990	20:04:24.39
D82032.DAT;1	9620/9624	13-JUN-1990	20:15:17.28
D82033.DAT;1	8816/8816	13-JUN-1990	20:25:14.41

D82034.DAT;1	7957/7960	13-JUN-1990	20:33:38.09	
D82035.DAT;1	10293/10296	13-JUN-1990	20:42:42.36	
D82036.DAT;1	10426/10432	13-JUN-1990	20:52:54.05	
D82037.DAT;1	8159/8160	13-JUN-1990	21:02:02.05	
D82038.DAT;1	9594/9600	13-JUN-1990	21:11:41.11	
D82039.DAT;1	)	8508/8512	13-JUN-1990	21:21:28.16
D82040.DAT;1	)	8911/8912	13-JUN-1990	21:31:08.43
D82041.DAT;1	)	6954/6960	13-JUN-1990	21:39:48.35
D82042.DAT;1	)	7021/7024	13-JUN-1990	21:47:23.36
D82043.DAT;1	)	5412/5416	13-JUN-1990	21:54:07.00
D82044.DAT;1	)	8588/8592	14-JUN-1990	16:59:03.37
D82045.DAT;1	)	9117/9120	14-JUN-1990	17:07:53.19
D82046.DAT;1	)	7673/7680	14-JUN-1990	17:16:12.41
D82047.DAT;1	)	8820/8824	17:24:25.15	
D82048.DAT;1	)	8620/8624	14-JUN-1990	17:33:04.16
D82049.DAT;1	)	8755/8760	14-JUN-1990	17:41:41.31
D82050.DAT;1	)	7112/7112	14-JUN-1990	17:49:33.55
D82051.DAT;1	)	8633/8640	14-JUN-1990	17:57:25.85
D82052.DAT;1	)	5143/5144	14-JUN-1990	18:04:15.73
D82053.DAT;1	)	6604/6608	14-JUN-1990	18:10:10.54
D82054.DAT;1	)	6401/6408	14-JUN-1990	18:16:40.62
D82055.DAT;1	)	4276/4280	15-JUN-1990	11:39:04.27
D82056.DAT;1	)	7471/7472	15-JUN-1990	11:45:45.26
D82057.DAT;1	)	5991/5992	15-JUN-1990	11:53:18.57
D82058.DAT;1	)	6529/6536	15-JUN-1990	12:00:40.08
D82059.DAT;1	)	6424/6424	15-JUN-1990	12:08:00.70
D82060.DAT;1	)	5744/5744	15-JUN-1990	12:14:47.95
D82061.DAT;1	)	7464/7464	15-JUN-1990	12:22:16.42
D82062.DAT;1	)	6729/6736	15-JUN-1990	12:30:20.87
D82063.DAT;1	)	6828/6832	15-JUN-1990	12:38:04.51
D82064.DAT;1	)	6461/6464	15-JUN-1990	12:45:44.89
D82065.DAT;1	)	7904/7904	15-JUN-1990	12:54:04.85
D82066.DAT;1	)	7664/7664	15-JUN-1990	13:03:12.35
D82067.DAT;1	)	6768/6768	15-JUN-1990	13:11:53:39
D82068.DAT;1	)	6301/6304	15-JUN-1990	13:19:38.61
D82069.DAT;1	)	4828/4832	21-JUN-1990	11:25:51.09
D82070.DAT;1	)	9004/9008	21-JUN-1990	11:36:30.18
D82071.DAT;1	)	7526/7528	21-JUN-1990	11:47:17.05
D82072.DAT;1	)	1464/1464	21-JUN-1990	11:53:32.00
D82073.DAT;1	)	0/0	21-JUN-1990	11:54:48.60
D82074.DAT;1	)	11195/11200	21-JUN-1990	12:02:43.26
D82075.DAT;1	)	9958/9960	21-JUN-1990	12:16:38.87
D82076.DAT;1	)	10434/10440	21-JUN-1990	12:30:01.86
D82077.DAT;1	)	8068/8072	21-JUN-1990	12:42:18.91
D82078.DAT;1	)	5490/5496	21-JUN-1990	14:57:47.41
D82079.DAT;1	)	9832/9832	21-JUN-1990	15:08:36.72
D82080.DAT;1	)	8364/8368	21-JUN-1990	15:21:25.10
D82081.DAT;1	)	10384/10384	21-JUN-1990	15:33:13.84
D82082.DAT;1	)	11043/11048	21-JUN-1990	15:48:14.99
D82083.DAT;1	)	13246/13248	21-JUN-1990	16:03:38.44
D82084.DAT;1	)	9882/9888	21-JUN-1990	16:18:07.81
D82085.DAT;1	)	9988/9992	21-JUN-1990	16:28:30.86
D82086.DAT;1	)	11498/11504	21-JUN-1990	16:39:10.20
D82087.DAT;1	)	12436/12440	21-JUN-1990	16:51:08.33
D82088.DAT;1	)	13038/13040	21-JUN-1990	17:05:54.82
D82089.DAT;1	)	9562/9568	21-JUN-1990	17:18:53.14
D82090.DAT;1	)	7704/7704	21-JUN-1990	17:28:32.17
D82091.DAT;1	)	9489/9496	21-JUN-1990	20:22:38.15
D82092.DAT;1	)	12224/12224	21-JUN-1990	20:34:33.92
D82093.DAT;1	)	6589/6592	21-JUN-1990	20:44:08.80

D82097.DAT;1 8025/8032 21-JUN-1990 20:51:27.18  
D82098.DAT;1 11415/11416 21-JUN-1990 21:01:06.77  
D82099.DAT;1 8327/8328 21-JUN-1990 21:10:48.15  
D82100.DAT;1 10769/10776 21-JUN-1990 21:20:16.45  
D82101.DAT;1 9676/9680 21-JUN-1990 21:30:20.94  
D82102.DAT;1 9943/9944 21-JUN-1990 21:40:02.50  
D82103.DAT;1 7101/7104 21-JUN-1990 21:48:25.77  
D82104.DAT;1 10836/10840 21-JUN-1990 21:57:21.80  
D82105.DAT;1 12652/12656 21-JUN-1990 22:08:57.75  
D82106.DAT;1 10058/10064 21-JUN-1990 22:20:06.93  
D82107.DAT;1 12249/12256 21-JUN-1990 22:31:08.90  
D82108.DAT;1 9773/9776 21-JUN-1990 22:41:57.48  
D82109.DAT;1 10887/10888 21-JUN-1990 22:52:10.93  
D82110.DAT;1 12975/12976 21-JUN-1990 23:03:57.72

Total of 166 files, 1794174/1794728 blocks.

Grand total of 3 directories, 181 files, 1794587/1795192 blocks.

```

Directory $1$DUB3:F0000001 DEB1_0002B
000000.DIR;1 1/8 22-JUN-1990 10:19:18.05
BACKUP.SYS;1 0/0 22-JUN-1990 10:19:18.05
BADELK.SYS;1 8/8 22-JUN-1990 10:19:18.05
BADLOG.SYS;1 0/0 22-JUN-1990 10:19:18.05
BITMAP.SYS;1 63/64 22-JUN-1990 10:19:18.05
CONFIG.SYS;1 1/8 22-JUN-1990 10:19:22.78
CONTIN.SYS;1 0/0 22-JUN-1990 10:19:18.05
CORIMG.SYS;1 0/0 22-JUN-1990 10:19:18.05
INDEXF.SYS;1 288/288 22-JUN-1990 10:19:18.05
MAGB.DIR;1 1/8 22-JUN-1990 10:19:21.35
VOLSET.SYS;1 0/0 22-JUN-1990 10:19:18.05

Total of 11 files, 362/384 blocks.

Directory $1$DUB3:[MAGB]
DATA.DIR;1 1/24 22-JUN-1990 10:19:22.18
FORMAT.SFD;2 3/8 12-MAR-1992 10:49:05.19
READ.ME-FIRST.DAT;1 11/16 17-JUN-1992 14:06:28.92
VOLDESC.SFD;12 34/40 17-JUN-1992 16:05:39.75

Total of 4 files, 59/88 blocks.

Directory $1$DUB3:[MAGB.DATA]
D82111.DAT;2 6618/6624 24-JUN-1990 10:29:38.00
D82111.DAT;1 6618/6624 22-JUN-1990 10:32:36.04
D82112.DAT;1 11390/11392 22-JUN-1990 10:42:30.41
D82113.DAT;1 8124/8128 22-JUN-1990 10:53:45.76
D82114.DAT;1 8219/8224 22-JUN-1990 11:03:22.59
D82115.DAT;1 14100/14104 22-JUN-1990 11:32:20.42
D82116.DAT;1 15549/15552 22-JUN-1990 11:49:14.53
D82117.DAT;1 14444/14448 22-JUN-1990 12:07:05.22
D82118.DAT;1 10573/10576 22-JUN-1990 12:21:52.92
D82119.DAT;1 11365/11368 22-JUN-1990 12:34:19.46
D82120.DAT;1 12183/12184 22-JUN-1990 12:48:46.57
D82121.DAT;1 12477/12480 22-JUN-1990 13:03:08.40
D82122.DAT;1 14914/14920 22-JUN-1990 13:19:34.96
D82123.DAT;1 12782/12784 22-JUN-1990 13:37:08.79
D82124.DAT;1 10637/10640 22-JUN-1990 13:54:25.83
D82125.DAT;1 12999/13000 22-JUN-1990 14:08:10.49
D82126.DAT;1 5830/5832 22-JUN-1990 14:20:00.34
D82127.DAT;1 8670/8672 22-JUN-1990 14:29:44.02
D82128.DAT;1 10273/10280 22-JUN-1990 14:42:10.81
D82129.DAT;1 10963/10968 22-JUN-1990 14:54:30.39
D82130.DAT;1 9955/9960 22-JUN-1990 15:06:18.54
D82131.DAT;1 9974/9976 22-JUN-1990 15:17:10.03
D82132.DAT;1 11977/11984 22-JUN-1990 15:29:32.81
D82133.DAT;1 7979/7984 22-JUN-1990 15:41:19.15
D82134.DAT;1 11074/11080 25-JUN-1990 15:58:22.98
D82135.DAT;1 10970/10976 25-JUN-1990 16:11:07.33
D82136.DAT;1 13744/13744 25-JUN-1990 16:25:17.13
D82137.DAT;1 10361/10368 25-JUN-1990 16:39:03.74
D82138.DAT;1 15000/15000 25-JUN-1990 16:54:29.42
D82139.DAT;1 13301/13304 25-JUN-1990 17:11:40.59
D82140.DAT;1 12829/12832 25-JUN-1990 17:27:43.18
D82141.DAT;1 15090/15096 25-JUN-1990 17:44:28.41

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D82142.DAT;1	11380/11384	25-JUN-1990	18:00:14:74
D82143.DAT;1	12866/12872	25-JUN-1990	18:14:40:88
D82144.DAT;1	11534/11536	25-JUN-1990	18:29:43:51
D82145.DAT;1	13259/13264	25-JUN-1990	18:44:12:40
D82146.DAT;1	10523/10528	25-JUN-1990	18:59:20:99
D82147.DAT;1	14162/14168	25-JUN-1990	19:14:29:72
D82148.DAT;1	11777/11784	25-JUN-1990	19:31:01:16
D82149.DAT;1	11812/11816	25-JUN-1990	19:45:31:44
D82150.DAT;1	10896/10896	25-JUN-1990	19:58:27:40
D82151.DAT;1	11020/11024	25-JUN-1990	21:08:55:46
D82152.DAT;1	13636/13640	25-JUN-1990	21:22:26:03
D82153.DAT;1	10512/10512	25-JUN-1990	21:36:29:15
D82154.DAT;1	10384/10384	25-JUN-1990	21:49:19:40
D82155.DAT;1	9401/9408	26-JUN-1990	14:44:13:66
D82156.DAT;1	11560/11560	26-JUN-1990	14:56:14:26
D82157.DAT;1	12426/12432	26-JUN-1990	15:09:30:67
D82158.DAT;1	12204/12208	26-JUN-1990	15:23:06:62
D82159.DAT;1	10700/10704	26-JUN-1990	15:33:35:41
D82160.DAT;1	9967/9968	26-JUN-1990	15:43:14:66
D82161.DAT;1	9004/9008	26-JUN-1990	15:52:08:44
D82162.DAT;1	10673/10680	26-JUN-1990	16:02:10:16
D82163.DAT;2	13672/13672	26-JUN-1990	22:44:28:48
D82164.DAT;1	13672/13672	26-JUN-1990	16:16:02:85
D82165.DAT;1	6313/6320	26-JUN-1990	22:54:52:23
D82166.DAT;2	6313/6320	26-JUN-1990	16:25:08:15
D82167.DAT;1	10629/10632	26-JUN-1990	23:04:15:20
D82168.DAT;1	10629/10632	26-JUN-1990	16:33:48:90
D82169.DAT;2	11364/11368	26-JUN-1990	23:16:17:90
D82170.DAT;1	11364/11368	26-JUN-1990	16:44:46:54
D82171.DAT;2	11172/11176	26-JUN-1990	23:28:28:47
D82172.DAT;1	11172/11176	26-JUN-1990	16:57:05:98
D82173.DAT;2	13960/13960	26-JUN-1990	23:41:45:28
D82174.DAT;1	13960/13960	26-JUN-1990	17:09:53:02
D82175.DAT;2	13856/13856	26-JUN-1990	23:56:38:65
D82176.DAT;1	13856/13856	26-JUN-1990	17:22:39:47
D82177.DAT;2	10479/10480	27-JUN-1990	10:55:14:49
D82178.DAT;1	9164/9168	27-JUN-1990	11:05:28:32
D82179.DAT;2	8815/8816	27-JUN-1990	11:15:04:75
D82180.DAT;1	4558/4560	27-JUN-1990	11:48:06:00
D82181.DAT;1	7613/7616	27-JUN-1990	11:54:14:78
D82182.DAT;1	8333/8336	27-JUN-1990	11:23:03:89
D82183.DAT;1	7742/7744	27-JUN-1990	12:05:49:37
D82184.DAT;1	10871/10872	27-JUN-1990	12:17:53:74
D82185.DAT;1	10990/10992	27-JUN-1990	11:41:06:16
D82186.DAT;1	6709/6712	27-JUN-1990	12:37:55:94
D82187.DAT;1	7023/7024	27-JUN-1990	12:46:17:73
D82188.DAT;1	6565/6568	27-JUN-1990	12:55:32:47
D82189.DAT;1	4116/4120	27-JUN-1990	13:02:07:80
D82190.DAT;1	8220/8224	27-JUN-1990	13:09:22:47
D82191.DAT;1	6735/6736	27-JUN-1990	13:17:25:43
D82192.DAT;1	6573/6576	27-JUN-1990	13:58:54:70
D82193.DAT;1	7884/7888	27-JUN-1990	14:12:56:61
D82194.DAT;1	7354/7360	27-JUN-1990	14:21:01:28

D82195.DAT;1	5991/5992	27-JUN-1990	14:28:16.15
D82196.DAT;1	9548/9552	27-JUN-1990	14:36:37.32
D82197.DAT;1	8496/8496	27-JUN-1990	15:46:28.37
D82198.DAT;1	9137/9144	27-JUN-1990	15:55:02.18
D82199.DAT;1	7746/7752	27-JUN-1990	16:02:59.52
D82200.DAT;1	10238/10240	27-JUN-1990	16:12:21.61
D82201.DAT;1	9263/9264	27-JUN-1990	16:22:31.57
D82202.DAT;1	10763/10768	27-JUN-1990	16:31:57.17
D82203.DAT;1	9982/9984	27-JUN-1990	16:41:33.30
D82204.DAT;1	10200/10200	27-JUN-1990	16:50:59.52
D82205.DAT;1	10031/10032	27-JUN-1990	17:00:24.53
D82206.DAT;1	7887/7888	27-JUN-1990	17:09:46.44
D82207.DAT;1	9285/9288	27-JUN-1990	17:19:09.26
D82210.DAT;1	995/10000	27-JUN-1990	17:29:09.63
D82211.DAT;1	9226/9232	27-JUN-1990	17:39:27.93
D82212.DAT;1	8710/8712	27-JUN-1990	17:49:13.82
D82213.DAT;1	10269/10272	27-JUN-1990	18:00:01.80
D82214.DAT;1	9001/9008	2-JUL-1990	15:51:19.25
D82215.DAT;1	8006/8008	2-JUL-1990	16:04:34.42
D82216.DAT;1	9547/9552	2-JUL-1990	16:13:58.36
D82217.DAT;1	8723/8728	2-JUL-1990	16:27:05.87
D82218.DAT;1	10623/10624	2-JUL-1990	16:38:21.22
D82219.DAT;1	4808/4808	2-JUL-1990	16:46:32.65
D82220.DAT;1	6284/6288	2-JUL-1990	16:52:42.76
D82221.DAT;1	6099/6104	2-JUL-1990	16:59:49.37
D82222.DAT;1	6471/6472	2-JUL-1990	17:06:47.03
D82223.DAT;1	7539/7544	2-JUL-1990	17:14:25.72
D82224.DAT;1	9213/9216	2-JUL-1990	22:13:52.75
D82225.DAT;1	9281/9288	2-JUL-1990	22:24:05.06
D82226.DAT;1	7905/7912	2-JUL-1990	22:33:52.64
D82227.DAT;1	8031/8032	2-JUL-1990	22:43:28.86
D82228.DAT;1	6099/6104	2-JUL-1990	22:51:46.91
D82229.DAT;1	7186/7192	2-JUL-1990	22:58:53.45
D82230.DAT;1	7912/7918	2-JUL-1990	23:05:35.85
D82231.DAT;1	5053/5056	2-JUL-1990	23:11:15.30
D82232.DAT;1	5342/5344	2-JUL-1990	23:16:54.47
D82233.DAT;1	6777/6784	2-JUL-1990	23:23:24.03
D82234.DAT;1	2125/2128	2-JUL-1990	23:27:56.64
D82235.DAT;1	2566/2568	2-JUL-1990	23:30:35.58
D82236.DAT;1	6269/6272	2-JUL-1990	23:35:25.89
D82237.DAT;1	4288/4288	2-JUL-1990	23:40:59.91
D82238.DAT;1	5634/5640	2-JUL-1990	23:46:20.24
D82239.DAT;1	7788/7792	2-JUL-1990	23:53:32.53
D82240.DAT;1	8400/8400	3-JUL-1990	00:02:04.94
D82241.DAT;1	6847/6848	3-JUL-1990	00:11:25.41
D82242.DAT;1	4324/4328	3-JUL-1990	00:17:31.91
D82243.DAT;1	5932/5936	3-JUL-1990	00:23:10.53
D82244.DAT;1	5811/5816	3-JUL-1990	00:29:31.23
D82245.DAT;1	6685/6688	3-JUL-1990	15:40:16.11
D82246.DAT;1	8797/8800	3-JUL-1990	15:50:04.95
D82247.DAT;1	8420/8424	3-JUL-1990	16:00:51.15
D82248.DAT;1	8359/8360	3-JUL-1990	16:11:24.69
D82249.DAT;1	8961/8968	3-JUL-1990	16:22:01.59
D82250.DAT;1	8860/8864	3-JUL-1990	16:32:51.38
D82251.DAT;1	7834/7840	3-JUL-1990	16:42:48.72
D82252.DAT;1	8259/8264	3-JUL-1990	16:52:16.72
D82253.DAT;1	7688/7688	3-JUL-1990	17:02:09.44
D82254.DAT;1	8500/8504	3-JUL-1990	17:12:15.41
D82255.DAT;1	7686/7688	3-JUL-1990	17:21:49.09
D82256.DAT;1	6401/6408	5-JUL-1990	08:50:29.44

D82257.DAT;1	7429/7432	5-JUL-1990	08:58:58.10
D82258.DAT;1	6593/6600	5-JUL-1990	09:06:47.09
D82259.DAT;1	5629/5632	5-JUL-1990	09:13:41.93
D82260.DAT;1	8373/8376	5-JUL-1990	09:22:21.30
D82261.DAT;1	8984/8984	5-JUL-1990	09:31:57.12
D82262.DAT;1	7993/8000	5-JUL-1990	09:41:36.62
D82263.DAT;1	7807/7808	5-JUL-1990	09:51:06.01
D82264.DAT;1	8575/8576	5-JUL-1990	10:00:32.25
D82265.DAT;1	6477/6480	5-JUL-1990	10:12:26.60
D82266.DAT;1	9354/9360	5-JUL-1990	10:23:02.53
D82267.DAT;1	8219/8224	5-JUL-1990	10:32:25.49
D82268.DAT;1	9587/9592	5-JUL-1990	10:42:57.60
D82269.DAT;1	10551/10552	5-JUL-1990	10:55:18.45
D82270.DAT;1	6606/6608	5-JUL-1990	11:07:46.22
D82271.DAT;1	8284/8288	5-JUL-1990	11:18:45.55
D82272.DAT;1	9953/9960	5-JUL-1990	11:41:28.19
D82273.DAT;1	8462/8464	5-JUL-1990	11:53:03.79
D82274.DAT;1	7727/7728	5-JUL-1990	12:02:40.67
D82275.DAT;1	8758/8760	5-JUL-1990	12:12:37.20
D82276.DAT;1	5360/5360	5-JUL-1990	12:21:12.97
D82277.DAT;1	8213/8216	5-JUL-1990	12:29:47.92
D82278.DAT;1	8472/8472	5-JUL-1990	12:40:08.49
D82279.DAT;1	8176/8176	5-JUL-1990	12:50:05.72
D82280.DAT;1	7066/7072	5-JUL-1990	12:59:17.89
D82281.DAT;1	9580/9584	5-JUL-1990	13:09:19.71

Total of 177 files, 1629043/1629640 blocks.

Grand total of 3 directories, 192 files, 1629464/1630112 blocks.

Directory \$1\$DUE3:[0000000]

000000.DIR;1	1/8	5-JUL-1990	13:49:24.03
BACKUP.SYS;1	0/0	5-JUL-1990	13:49:24.03
BADBLK.SYS;1	8/8	5-JUL-1990	13:49:24.03
BADLOG.SYS;1	0/0	5-JUL-1990	13:49:24.03
BITMAP.SYS;1	63/64	5-JUL-1990	13:49:24.03
CONFIG.SYS;1	1/8	5-JUL-1990	13:49:24.03
CONTIN.SYS;1	0/0	5-JUL-1990	13:49:24.03
CORIMG.SYS;1	0/0	5-JUL-1990	13:49:24.03
INDEXF.SYS;1	288/288	5-JUL-1990	13:49:24.03
MAGB.DIR;1	1/8	5-JUL-1990	13:49:31.20
VOLSET.SYS;1	0/0	5-JUL-1990	13:49:24.03

Total of 11 files, 362/384 blocks.

Directory \$1\$DUE3:[MAGB]

DATA.DIR;1	8/24	5-JUL-1990	13:49:33.32
FORMAT.SFD;2	3/8	12-MAR-1992	10:49:05.19
READ_ME.FIRST.DAT;1	11/16	17-JUN-1992	14:06:28.92
VOLDESC.SFD;13	39/40	17-JUN-1992	16:29:09.31

Total of 4 files, 61/88 blocks.

Directory \$1\$DUE3:[IMAGE.DAT]

D82282.DAT;1	9110/9112	5-JUL-1990	14:08:31.39
D82283.DAT;1	7877/7880	5-JUL-1990	14:20:43.12
D82284.DAT;1	10276/10280	5-JUL-1990	14:31:57.46
D82285.DAT;1	9845/9848	5-JUL-1990	14:44:23.00
D82286.DAT;1	7423/7424	5-JUL-1990	14:59:04.36
D82287.DAT;1	11273/11280	5-JUL-1990	15:11:30.36
D82288.DAT;1	10455/10456	5-JUL-1990	15:30:02.93
D82289.DAT;1	7397/7400	5-JUL-1990	15:43:40.99
D82290.DAT;1	9523/9528	5-JUL-1990	15:58:47.12
D82291.DAT;1	11458/11464	5-JUL-1990	16:17:20.13
D82292.DAT;1	9328/9328	5-JUL-1990	16:31:00.75
D82293.DAT;1	10507/10512	5-JUL-1990	16:44:26.93
D82294.DAT;1	8713/8720	5-JUL-1990	16:56:14.13
D82295.DAT;1	9217/9224	5-JUL-1990	17:07:16.26
D82296.DAT;1	9597/9600	5-JUL-1990	17:18:52.43
D82297.DAT;1	6837/6840	5-JUL-1990	17:28:59.30
D82298.DAT;1	9013/9016	5-JUL-1990	17:39:04.83
D82299.DAT;1	10512/10512	5-JUL-1990	17:51:52.14
D82300.DAT;1	6276/6280	5-JUL-1990	18:03:01.35
D82301.DAT;1	1074/10776	5-JUL-1990	18:13:17.16
D82302.DAT;1	10402/10408	5-JUL-1990	18:26:05.77
D82303.DAT;1	11681/11688	5-JUL-1990	18:39:37.60
D82304.DAT;1	9385/9392	5-JUL-1990	18:51:44.25
D82305.DAT;1	10816/10816	5-JUL-1990	19:46:13.81
D82306.DAT;1	9983/9984	5-JUL-1990	19:58:47.31
D82307.DAT;1	10761/10768	5-JUL-1990	20:12:53.56
D82308.DAT;1	9219/9224	5-JUL-1990	20:25:05.38
D82309.DAT;1	10540/10544	5-JUL-1990	20:37:27.00
D82310.DAT;1	9736/9736	5-JUL-1990	20:49:45.52
D82311.DAT;1	11680/11680	5-JUL-1990	21:03:15.74
D82312.DAT;1	10570/10576	5-JUL-1990	21:17:41.50
D82313.DAT;1	11944/11944	5-JUL-1990	21:31:37.43
D82314.DAT;1	11526/11528	5-JUL-1990	21:44:14.06

D231~00034

## DEB1\_0003A

D82315.DAT:1 9621/9624 5-JUL-1990 21:55:20.59  
D82316.DAT:1 11970/11976 5-JUL-1990 22:07:12.02  
D82317.DAT:1 5429/5432 5-JUL-1990 22:16:34.04  
D82318.DAT:1 9317/9320 5-JUL-1990 22:24:34.96  
D82319.DAT:1 7740/7744 5-JUL-1990 22:33:33.19  
D82320.DAT:1 10869/10872 5-JUL-1990 22:43:26.93  
D82321.DAT:1 11571/11576 5-JUL-1990 22:55:23.47  
D82322.DAT:1 12545/12552 5-JUL-1990 23:08:27.32  
D82323.DAT:1 11061/11064 5-JUL-1990 23:20:52.13  
D82324.DAT:1 9795/9800 5-JUL-1990 23:31:33.72  
D82325.DAT:1 12097/12104 6-JUL-1990 10:02:12.99  
D82326.DAT:1 12065/12072 6-JUL-1990 10:15:39.05  
D82327.DAT:1 10536/10536 6-JUL-1990 10:27:54.11  
D82328.DAT:1 15396/15400 6-JUL-1990 10:42:03.70  
D82329.DAT:1 14066/14072 6-JUL-1990 10:58:00.77  
D82330.DAT:1 13247/13248 6-JUL-1990 11:13:02.99  
D82331.DAT:1 12053/12056 6-JUL-1990 11:26:31.51  
D82332.DAT:1 13161/13168 6-JUL-1990 11:39:53.29  
D82333.DAT:1 15152/15152 6-JUL-1990 11:54:22.44  
D82334.DAT:1 11107/11112 6-JUL-1990 12:07:55.22  
D82335.DAT:1 8112/8112 6-JUL-1990 12:18:08.08  
D82336.DAT:1 9654/9656 6-JUL-1990 12:27:42.96  
D82337.DAT:1 7873/7880 6-JUL-1990 12:37:06.51  
D82338.DAT:1 12732/12736 6-JUL-1990 12:47:36.19  
D82339.DAT:1 12681/12683 6-JUL-1990 13:00:50.42  
D82340.DAT:1 10904/10904 6-JUL-1990 13:13:19.90  
D82341.DAT:1 8410/8416 6-JUL-1990 13:23:31.45  
D82342.DAT:1 12414/12416 6-JUL-1990 13:34:50.66  
D82343.DAT:1 10033/10040 6-JUL-1990 14:28:27.97  
D82344.DAT:1 11023/11024 6-JUL-1990 14:45:26.11  
D82345.DAT:1 11631/11632 6-JUL-1990 15:01:35.54  
D82346.DAT:1 11632/11632 6-JUL-1990 15:15:18.42  
D82347.DAT:1 10325/10328 6-JUL-1990 15:27:12.25  
D82348.DAT:1 7115/7120 6-JUL-1990 15:36:38.49  
D82349.DAT:1 10787/10792 6-JUL-1990 15:46:34.12  
D82350.DAT:1 9718/9720 6-JUL-1990 15:57:38.54  
D82351.DAT:1 5881/5888 6-JUL-1990 16:05:43.22  
D82352.DAT:1 7875/7880 6-JUL-1990 16:13:13.20  
D82353.DAT:1 9600/9600 6-JUL-1990 16:22:36.25  
D82354.DAT:1 4552/4552 6-JUL-1990 16:29:49.76  
D82355.DAT:1 5707/5712 6-JUL-1990 16:35:20.79  
D82356.DAT:1 4629/4632 6-JUL-1990 16:40:44.18  
D82357.DAT:1 5765/5768 6-JUL-1990 16:46:07.65  
D82358.DAT:1 1652/1656 6-JUL-1990 16:50:02.53  
D82359.DAT:1 4836/4840 6-JUL-1990 16:53:44.85  
D82360.DAT:1 5462/5464 6-JUL-1990 16:59:30.62  
D82361.DAT:1 8956/8960 6-JUL-1990 17:07:27.26  
D82362.DAT:1 7724/7728 6-JUL-1990 17:16:14.72  
D82363.DAT:1 8702/8704 6-JUL-1990 17:24:51.29  
D82364.DAT:1 6628/6632 6-JUL-1990 17:32:46.49  
D82365.DAT:1 7707/7712 6-JUL-1990 17:40:40.78  
D83001.DAT:1 5454/5456 8-JUL-1990 15:05:21.34  
D83002.DAT:1 8735/8736 8-JUL-1990 15:14:21.07  
D83003.DAT:1 4809/4816 8-JUL-1990 15:22:08.65  
D83004.DAT:1 4461/4464 8-JUL-1990 15:27:33.89  
D83005.DAT:1 9561/9568 8-JUL-1990 15:36:47.52  
D83006.DAT:1 6543/6544 8-JUL-1990 15:45:58.91  
D83007.DAT:1 9359/9360 8-JUL-1990 15:55:38.52  
D83008.DAT:1 8281/8288 8-JUL-1990 16:05:15.47  
D83009.DAT:1 5151/5152 8-JUL-1990 16:13:02.77

### D8B1-0003A

D83010.DAT;1	2710/2712	8-JUL-1990 16:18:01.55
D83011.DAT;1	6174/6176	8-JUL-1990 16:23:34.69
D83012.DAT;1	6331/6336	8-JUL-1990 16:30:46.79
D83013.DAT;1	8090/8096	8-JUL-1990 16:40:01.97
D83014.DAT;1	4215/4216	8-JUL-1990 16:46:20.10
D83015.DAT;1	9288/9288	8-JUL-1990 16:53:49.99
D83016.DAT;1	6860/6864	8-JUL-1990 17:02:09.55
D83017.DAT;1	8834/8840	8-JUL-1990 17:11:08.40
D83018.DAT;1	8225/8232	8-JUL-1990 17:21:38.85
D83019.DAT;1	8557/8560	8-JUL-1990 17:31:08.27
D83020.DAT;1	9037/9040	8-JUL-1990 17:42:00.51
D83021.DAT;1	9292/9296	8-JUL-1990 17:50:59.81
D83022.DAT;1	11084/11088	8-JUL-1990 18:01:06.88
D83023.DAT;1	7599/7600	8-JUL-1990 18:11:33.80
D83024.DAT;1	7572/7576	8-JUL-1990 18:20:10.95
D83025.DAT;1	9339/9344	8-JUL-1990 18:29:50.57
D83026.DAT;1	7854/7856	8-JUL-1990 18:39:22.88
D83027.DAT;1	8116/8120	8-JUL-1990 18:48:23.18
D83028.DAT;1	6809/6816	8-JUL-1990 18:56:34.01
D83029.DAT;1	7418/7424	8-JUL-1990 22:03:33.16
D83030.DAT;1	5973/5976	8-JUL-1990 22:09:51.20
D83031.DAT;1	5712/5712	8-JUL-1990 22:15:31.09
D83032.DAT;1	5582/5584	8-JUL-1990 22:20:58.42
D83033.DAT;1	4759/4760	8-JUL-1990 22:25:54.28
D83034.DAT;1	3536/3536	8-JUL-1990 22:29:50.29
D83035.DAT;1	2836/2840	8-JUL-1990 22:32:58.05
D83036.DAT;1	4571/4576	8-JUL-1990 22:36:43.39
D83037.DAT;1	3293/3296	8-JUL-1990 22:40:30.72
D83038.DAT;1	5076/5080	8-JUL-1990 22:44:43.68
D83039.DAT;1	672/672	8-JUL-1990 22:47:16.64
D83040.DAT;1	4074/4080	8-JUL-1990 22:49:57.03
D83041.DAT;1	5671/5672	8-JUL-1990 22:54:45.73
D83042.DAT;1	3658/3664	8-JUL-1990 22:59:17.47
D83043.DAT;1	5919/5920	8-JUL-1990 23:04:06.94
D83044.DAT;1	2663/2664	8-JUL-1990 23:08:11.44
D83045.DAT;1	3644/3648	8-JUL-1990 23:11:21.16
D83046.DAT;1	5817/5824	8-JUL-1990 23:16:05.36
D83047.DAT;1	1654/1656	8-JUL-1990 23:19:31.59

Total of 131 files, 1104040/1104496 blocks.

Grand total of 3 directories, 146 files, 1104463/1104968 blocks.

\h\n Dump of file \$1\$DUB62:[MAGB].DATAJD81227.DAT:5 on 14-APR-1994 16:49:11.97  
File ID (82,1,0) End of file block 2735 / Allocated 2736

[REDACTED] 00000001), 16 (0010) bytes  
[REDACTED] 00000002), 16 (0010) bytes  
[REDACTED] 70ACC775 73FEC7F4 E2C447FA 0809FD28 (ÿ..üGÀäöGÇsuçßp..... 000000  
[REDACTED] 00000003), 16 (0010) bytes  
B9E0C6F3 7698C774 F70847BB 0809FF99 ....»G.«tç.v6Eà:..... 000000  
  
Record number [REDACTED] (000155CC), 16 (0010) bytes  
6E40C5F5 AD764823 C2E046FD 2B0F739D .s.+ÿFÀ#HvçüAan..... 000000  
Record number [REDACTED] (000155CD), 16 (0010) bytes  
6E80C5F5 B0624823 AAE846FD 2B0F760E .v.+ÿFèééHb°üA.n..... 000000  
Record number [REDACTED] (000155CE), 16 (0010) bytes  
6E80C5F5 B0624823 AAE846FD 2B0F787F .x.+ÿFèééHb°üA.n..... 000000  
Record number [REDACTED] (000155CF), 16 (0010) bytes  
6EC2C5F5 B34F4823 92EB46FD 2B0F7AFO ½z.+ÿFèééHb°üAan..... 000000

This dump was produced using the commands:

```
$ dump/records=(start:1,count:3) $1$dub62:[magb].datajd81227.dat  
$ dump/records=(start:87500,count:4) $1$dub62:[magb].datajd81227.dat
```

To find time span of day:  
1) Convert 1st word to decimal  
2) Divide by 1000 - use result for offset to step 3  
3) Execute program MSEC (at the  
# prompt, enter msec, to translate  
into HH:MM:SS,SSS format.

DE-B  
81-070B-09C  
Software Tape

DYNAMICS EXPLORER 2

LANG SOFTWARE TAPE

81-070B-09C

THIS DATASET CONSIST OF 1 MAGNETIC TAPE. THE TAPE IS 9-TRACK, 6250 BPI, VAX LABELED, WITH A LABEL NAME OF "LANG". THIS SOFTWARE TAPE DESCRIBES THE LANG DATA TAPES(81-070B-09D) AND THE SOFTWARE FOR USING THE DATA. A LIST OF THE TAPES DIRECTORIES HAVE BEEN INCLUDED. THE D AND THE C NUMBER IS LISTED BELOW.

D#	C#	FILES
D- <u>107571</u>	C- <u>031455</u>	<u>10</u>

This is the LANG format file

CCSDYDNM000200NSSD0005SMRK0001

TYPE OF FILE NAME: LANG I-FILES

FILE ATTRIBUTES:

File records are 35 (4-byte) words in length (note, RECL = 35) and cover 8 seconds (16 half-sec. samples) of data. The first word is overhead for the keyed-indexed organization. The second word is universal time in msec. of the first half-second of data in the record. The remaining 33 words are the data, in a packed integer form, covering 16 half-second-resolution samples that begin at that UT (call them DATA(1)-DATA(33)). Thus a typical initial (keyed) READ statement is

```
READ(1,KEYGE=SOME_UT,ERR=label2) ITIME,(IDATA(J),J=1,33)
```

This will read the first record with ITIME>=SOME\_UT (both times being in msec). Subsequent READ statements can read sequentially by removing the phrase KEYGE=SOME\_UT, possibly adding END=label3.

The 3rd through 35th words of the record comprise the data. The 3rd word (IDATA(1) above) is satellite specific data (IMODE(1-2), IDED, IBIAS, ICMD, IANA, and ION) packed as follows

```
((((IMODE(1)*4+IMODE(2))*4+IDED)*4+IBIAS)*2+ICMD)*4+IANA)*2+ION
```

As implied, these seven data are 1 or 2 bit fields.

IMODE(1:2)	2 bits, mode of each of the two probes
= 0	adapt
= 1	step
= 2	ion hold
= 3	electron hold
IDED	2 bits, which probe is dedicated
IBIAS	2 bits, indicates the extra bias potential applied to the sweep, negative, positive, none.
ICMD	1 bit, command, not used
IANA	2 bits, which probe is analog
ION	1 bit, probe on switch

The 4th through 35th words of the record are paired up (i.e. IDATA(2) and IDATA(3), IDATA(4) and IDATA(5), ..., IDATA(32) and IDATA(33)) so that the 16 pairs cover the 16 half-seconds of data in the 8-second interval. These pairs are packed as follows:

```
IDATA(2i)=((DV(1)*1024)+DV(2))*1024+NI(1)
    +1          {if NI(1) is negative}
    +1024       {if DV(2) is negative}
    +1024**2    {if DV(1) is negative}
```

where i=1,2,3,...,16

```
IDATA(2i+1)=((NI(2)*256)+IV)*1024+N
    +1          {if N=max(NE(1),NE(2)) is negative}
    +1024       {if IV=max(V(1),V(2)) is negative}
    +1024*256   {if NI(2) is negative}
```

where i=1,2,3,...,16

These are 8 or 10 bit data fields

V(1:2)	8 bits,	VA start of sweep potential
DV(1:2)	10 bits,	VA slope for this sweep, Te of last sweep
NI(1:2)	10 bits,	Current detector range used in this sweep, 2 bits for decade range, 8 bits for vernier range
NE(1:2)	10 bits,	decade range (2 bits) and curve amplitude (8 bits) giving electron current

The subroutines INFL\_CONVER and INF\_VGET are sample algorithms for, respectively, the unpacking and translation of this array (DATA) of packed integers. This software is on the LANG description tape LANGDESC and is also available upon request from the LANG contact person Walter R. Hoegy over SPAN DEIO::HOEGY, DE614::HOEGY.

LOGICAL\_RECORD\_LENGTH: 35 bytes

TYPE\_OF\_FILE\_DESCRIPTION:

Files are indexed organization using time in milliseconds as the key. A typical OPEN statement is

```
OPEN(UNIT=1,NAME='disk:[directory]Iyyddd.DAT',TYPE='OLD',
      ACCESS='KEYED',KEY=(1:4:INTEGER),RECL=35,READONLY,
      FORM='UNFORMATTED',ORGANIZATION='INDEXED',ERR=label1)
```

File records are 35 (4-byte) words in length (note RECL above) and cover 8 seconds (16 half-sec. samples) of data. The first word is overhead for the keyed-indexed organization. The second word is universal time in msec. of the first half-second of data in the record. The remaining 33 words are the data, in a packed integer form, covering 16 half-second-resolution samples that begin at that UT (call them DATA(1)-DATA(33)).

FILE\_STRUCTURE:

I-files are written as VAX unformatted sequential ,keyed-indexed files.

FORMAT\_OF\_THE\_LOGICAL\_RECORD:

SEE FILE ATTRIBUTES:

FIELD\_RELATIONSHIPS:

SEE FILE ATTRIBUTES:

CCSDYDNM000200NSSD0005EMRK0001

This is the LANG tape description file, TAPEDESC.LANG

This tape, the LANG DESCRIPTION TAPE -- labeled LANG --, is being supplied to the NSSDC well in advance of the delivery of the data tapes. In addition to containing all LANG software, catalogs, FORTRAN source files and com files, this description tape is documented (contains documentation) to insure that the various programs will be compiled and linked appropriately to produce the required geophysical data.

This tape contains the following files:  
(size listed is approximate size on VAX disk in blocks)

Catalog files:

ILANG.CAT;2 261

COM files:

PROTAP.COM;14 4

Data files:

BADLANG.DAT;1 2

LANGTAPELIST.DAT;1 98

SPINNERSLANG.DAT;1 17

FORTRAN source files:

LANGSUBROUTINES.FOR;7 23

EXAMLANG.FOR;7 6

Documentation file:

TAPEDESC.LANG;10 10

NSSDC SFD files:

FORMAT.SFD;2 9

VOLDESC.SFD;12 38

Total of 10 files, 468 blocks.

\*\*\*\*\*

DESCRIPTION\_OF\_CATALOG\_FILES

The catalog file ILANG.CAT contains a list of the date and the start and stop times in milliseconds of all TM segments that have been processed into LANG I-files. This catalog can be searched using the VAX editor EDT to find whether a given date has data and if it has data, what are the start and stop times of the data.

DESCRIPTION\_OF\_COM\_FILES

The only com file is PROTAP.COM which is used only to promote the data.

To promote data from a tape use PROTAP.COM

(1) To promote all data from the tape answer

'1ST DAY TO BE PROMOTED' with the yyddd of the tape label  
and 'LAST DAY TO BE PROMOTED' with the same yyddd+99  
(i.e. 82000 and 82099 for tape I82000 and even  
82300 and 82399 for tape I82300)

(2) To promote less than the entire tape answer

'1ST DAY...' and 'LAST DAY...' as per required data  
(i.e. 82322 and 82345 for days 82322-82345)

Once the data is online, use EXAMLANG.EXE to read inflight data into a formatted file or modify EXAMLANG.FOR for your particular needs.

DESCRIPTION\_OF\_DATA\_FILES

The data file BADLANG.DAT contains a list of dates and start and stop times in HHMMSS format (hour minute second) when the summary plots showed some problem with the LANG data. The data is considered unusable during these times. The cause is unknown, but may be due to anomalous operation of the instrument or an anomaly in the data transmission. These times were used to delete bad data from the unified abstract database. There may not be data segments in ILANG.CAT corresponding to these times; when such data segments exist, do not process those times.

The data file SPINNERSLANG.DAT contains a list of dates and start and stop times in HHMMSS format when the spacecraft was spinning. This data is good for diagnostic purposes by the LANG group only and should therefore be considered in the same category as the data in BADLANG.DAT. Do not use data for the times listed in SPINNERSLANG.DAT.

#### DESCRIPTION\_OF\_FORTRAN\_SOURCE\_FILES

EXAMLANG is the driver which interactively opens and reads the I-files, and then writes the LANG parameters: Te Np (plasma density) and Vs (satellite potential) to a file or to the screen. This file is a prototype for the user's own program for processing the data; it demonstrates how to call the subroutines and functions contained in LANGSUBROUTINES.FOR. EXAMLANG prompts for the date and start and stop time (in seconds) for the data which is written in formatted output to a file of the user's choice or to unit 6, the user's terminal. EXAMLANG.FOR calls the subroutine INFL\_READ and the function FNENI.

The subroutines contained in LANGSUBROUTINES.FOR are: INFL\_READ, INFL\_CONVERT, and INFL\_VGET. INFL\_READ opens the appropriate data file (I-file with name IYYDDD.dat, where YYDDD is the date) and reads the packed integer data, and places the unpacked (real & integer) data in an array for the calling program (i.e. EXAMLANG). INFL\_CONVERT unpacks the integer data and applies INFL\_VGET to transform the integer data (as stored in TM) into the geophysical parameters of temperature, density, and satellite potential. The functions FNE and FNI evaluate Ne and Ni from the calculated current and potential.

#### SUMMARY\_OF\_HOW\_TO\_USE\_PROGRAMS

The programs needed are: (1) PROTAP.COM and (2) EXAMLANG.EXE or EXAMLANG.FOR, and LANGSUBROUTINES.FOR (to be compiled and linked appropriately). Once linked EXAMLANG.EXE looks for the I-file(s) in SYS\$MAF and tries to write out any saved data file in SYS\$PROC therefore the two following assignments need to be made prior to running EXAMLANG or using ROTAP.COM.

```
ASSIGN <your I-file destination directory> SYS$MAF  
ASSIGN <saved data destination directory> SYS$PROC
```

Now you are ready to run. Good luck.

The LANG volume description file.

This tape, the LANG DESCRIPTION TAPE -- LANGDESC --, will be supplied to the NSSDC well in advance of the delivery of the data tapes. In addition to containing all LANG software, catalogs, FORTRAN source files and com files, this description tape will be documented (contains documentation) to insure that the various programs will be compiled and linked appropriately in producing the required geophysical data.

CCSDXZLM0001SMARK001CCSDXVNM0002SMRK0001  
LOG\_VOL\_IDENT: USANASANSSDDEB9\_0001  
LOG\_VOL\_CLOSING\_DATE: 1989-10-31  
LOG\_VOL\_FILE\_STRUCTURE: FILES-11  
TAPE\_DENSITY=6250 BPI  
TAPE\_TRACKS=9  
TAPE\_LENGTH=2400 INCHES  
COMPUTER\_MFGR: DIGITAL EQUIPMENT CORPORATION  
OPERATING\_SYSTEM: MICROVMS 4.7  
COMPUTER\_SYSTEM: MICRO VAX II  
TECHNICAL\_CONTACT: DR. W. R. HOEGY  
CODE 614  
NASA/GSFC  
GREENBELT, MD 20771  
PHONE: 301-286-3837  
SPAN: DE614:::, DEIO::HOEGY, PACF::HOEGY  
PREV\_VOL\_IDENT: NONE  
CCSDXVNM0002EMRK0001CCSDXKNM0002SMRK0003  
DATA\_SET\_NAME: LANG ELECTRON DENSITY AND TEMPERATURE  
DATA\_SOURCES: DYNAMICS EXPLORER B, LANGMUIR PROBE (LANG)  
INVESTIGATOR\_CONTACT: MR. LARRY H. BRACE  
CODE 614  
NASA/GSFC  
GREENBELT, MD 20771  
PHONE: 303-286-8575  
SPAN: DE614::HOEGY

SOURCE\_CHARACTERISTICS:

A. DESCRIPTION\_OF\_SPACECRAFT:

The Dynamics Explorer 2 spacecraft was one of two satellites launched for the Dynamics Explorer program. The two spacecraft were launched together into coplanar polar orbits for the purpose of studying coupling between the magnetosphere, ionosphere, and the atmosphere. The DE-2 spacecraft was placed in a low elliptical orbit whereas the DE-1 orbit was highly elliptical. Instruments aboard the DE-2 spacecraft were: magnetometer, vector electric field instrument, neutral atmosphere composition spectrometer, wind and temperature spectrometer, Fabry-Perot interferometer, ion drift meter, retarding potential analyzer, low altitude plasma instrument, and Langmuir probe.

B. ORBIT\_INFORMATION:

Because the Delta launch vehicle did not complete a full burn the DE-2 satellite was placed in a lower than anticipated polar orbit, initially 1012 by 309 km. The orbital period was 98 min. The DE-1 and DE-2 satellites were launched by the same vehicle so that their orbits would be coplanar, all owing occasional two-point measurements along magnetic field lines. The DE-2 spacecraft spun once per orbit and the spin axis was perpendicular to the orbital plane so that one axis of the satellite always was aligned with the center of the earth.

C. PERFORMANCE:

The DE-2 spacecraft performed well through its lifetime. Power limitations forced the duty cycle to be limited to an average which was originally targeted at 30%. The lifetime of the spacecraft was shorter than anticipated because of the less than nominal performance of the launch vehicle.

The launch was on Aug. 3, 1981 and the DE-2 satellite reentered the atmosphere on Feb. 19, 1983, with the last contact the day before.

TIME\_SPAN\_OF\_THE DATA: 8-AUG-81 TO 15-JAN-83

INVESTIGATION OBJECTIVES:

The LANG objective was to provide electron temperature, plasma density, and spacecraft potential at high resolution of 0.5 seconds to study energetics of the thermal plasma and density structure of the ionosphere including large scale structures, traveling ionospheric disturbances, and plasma waves.

INSTRUMENT ATTRIBUTES:

A. DESCRIPTION\_OF\_INSTRUMENT:

The Dynamics Explorer Langmuir Probe Instrument (LANG) performs in-situ measurements of electron temperature and ion density. Two independent sensors are connected to individual adaptive sweep voltage circuits which continuously track the changing electron temperature and spacecraft potential while autoranging electrometers adjust their gain in response to the changing plasma density. Each voltage sweep takes place in 0.5 seconds. The control signals used to achieve this automatic tracking provide a continuous monitoring of the ionospheric parameters (at 0.5 second resolution) without telemetering each volt-ampere curve. The volt-ampere curves are transmitted twice every 8 seconds (50 samples during one 0.5 second sweep) using digital (10 bit accuracy) stored data. Analog data is digitized by the spacecraft at 8 bit resolution and provides volt-ampere data at 64 samples/second. During much of the mission probe 1 was in the ion hold mode providing 64 samples/second resolution ion density data via the analog data channel. (See Space Science Instrumentation, Vol 5, 493, 1981).

B. OPERATION\_MODE:

Inflight electron temperature, ion and electron density, and satellite potential are detected every 0.5 second. Two stored volt-ampere curves are detected every 8 seconds. analog volt-ampere curves every 0.5 second at a rate of 64 samples/second. Normal operating mode is: probe 2 in adaptive mode to give electron temperature and ion density; probe 1 in ion hold mode to give high resolution ion density at 64 samples/second.

C. MEASURED\_PARAMETERS:

Electrometer gain and applied voltage (start and slope) settings for every 0.5 second framed volt-ampere sweep are directly sensed. These telemetered engineering parameters are used to derive the inflight values of ion density, electron density, electron temperature, and satellite potential based on calibration with the raw volt-ampere data.

Electrometer gain and applied voltage of volt-ampere curves for stored and analog data channels are telemetered for ground analysis. The geophysical parameters, electron temperature, ion density, satellite potential, and electron density, are derived from this raw volt-ampere data. 64 sample/second ion density is derived from the analog volt-ampere data when probe 1 is in ion hold mode.

D. PERFORMANCE\_OF\_THE\_INSTRUMENT:

The LANG instrument returned usable data from shortly after launch until reentry. During some spinning orbits the instrument was placed in a special stepping mode to calibrate the accelerated electron current. Probe 2 was successfully cleaned and provided accurate electron temperatures throughout the mission. Probe 1 was contaminated and therefore could not provide accurate temperatures; it did provide accurate, high resolution ion densities. Probe 2 was used for the inflight temperature, density, and satellite potential.

E. RESOLUTION:

Each LANG record contains 0.5 second resolution engineering parameters from which the inflight electron temperature, electron and ion density, and satellite potential are derived using simple computer code.

PARAMETERS:

The geophysical parameters derived from the Langmuir probe are electron temperature (Te), plasma density (either ion density Ni from the ion acceleration region of the probe volt-ampere characteristic when the probe is negative with respect to the plasma and measures ion, and electron density Ne from the electron acceleration region when the probe is positive and retards the ions and accelerates the electrons) and satellite potential, Vs which is the potential difference between the probe and the undisturbed ionosphere plasma. These geophysical parameters are derived every 0.5 seconds from a voltage sweep of the probe which generates an internal volt-ampere curve. The curve is framed by adjusting the gain decade and vernier settings so that the accelerated ion current produces an electrometer output voltage of -3.3 volts, the voltage sweep is adjusted so that the electron current produces an electrometer output voltage of 9.5 volts after a voltage difference of 8kTe from the starting voltage. This frames the volt-ampere curve to maximize the resolution of the temperature and density. The inflight engineering parameters from which Te Ni Ne and Vs are derived are telemetered every 0.5 seconds. The detailed engineering parameters described as follows:

IMODE(1:2) 2 bits, mode of each of the two probes

= 0 adapt  
= 1 step  
= 2 ion hold  
= 3 electron hold

IDED 2 bits, which probe is dedicated

IBIAS 2 bits, indicates the extra bias potential applied to the sweep, negative, positive, none.

ICMD 1 bit, command, not used

IANA 2 bits, which probe is analog

ION 1 bit, probe on switch

V(1:2) 8 bits, VA start of sweep potential

DV(1:2) 10 bits, VA slope for this sweep, Te of last sweep

NI(1:2) 10 bits, Current detector range used in this sweep, 2 bits for decade range, 8 bits for vernier range

NE(1:2) 10 bits, decade range (2 bits) and curve amplitude (8 bits) giving electron current

These engineering parameters are converted to the geophysical electron temperature, ion and electron density, and satellite potential using the subroutines contained in the file LANGSUBROUTINES.FOR on tape LANGDESC. Each file contains a functional description clarifying usage.

#### DATA\_SET\_QUALITY:

The electron temperature and ion and electron density are accurate to about 10% at all altitudes. The subroutine supplied in LANGSUBROUTINES.FOR which converts the engineering parameters to geophysical Te Ni Ne and Vs, has built in limits which only produces Te when the density is greater than 1.E4, and which returns Ni when density is above 2.E4 and Ne when density is below 2.E4. The range of Te is from about 800 K to about 10,000 K, the range of Ni and Ne is: 1.E3 to 1.E6 for Ne and 1.E4 to 1.E7 for Ni; Vs has a possible range of about -10 volts to +7 volts, but is typically at -1.5 to -0.5 volts.

#### DATA\_PROCESSING\_OVERVIEW:

##### A. DATA\_PROCESSING CYCLE:

The raw telemetry data were routinely converted I-files containing the 0.5 second inflight engineering parameters which are converted by the software in LANGSUBROUTINES.FOR into geophysical parameters Te, Ne and Ni. There is one I-file for each day for which data was taken. Each daily I-file contains the telemetry segments listed on the catalog file LANGTAPELIST.DAT. The start and stop times of the telemetry segments are those of the raw telemetry segments. The files

LANGSUBROUTINES.FOR and LANGTAPELIST.DAT are supplied on the LANG document file LANGDESC.

#### B. HISTORY:

The I-files were produced routinely as telemetry became available. Telemetry was rescanned for missing passes at later times. Duplicate passes or parts of passes should have been eliminated and separate segments joined. The extreme segmentation or length of some telemetry passes resulted in the inability of the Sigma 9 to bring all the data on line within the allotted processing time and results in some passes still being incomplete. All files have been updated to final values and written on VAX formatted tapes.

DATA USAGE: Data are used to obtain the ambient electron temperature, ion density, electron density, and satellite potential. Lists of times when data is bad due to orbit problems or times when the spacecraft was spinning are listed in the files BADLANG.DAT for the bad data and SPINNERSLANG.DAT for the spinning orbits. These files are on the LANG document tape LANGDESC.

#### DATA ORGANIZATION:

##### LANGMUIR PROBE INFLIGHT DATA

\*\*\*\*\*  
Stored on 7 tapes labeled Iyyddd where ddd is a multiple of 100 (000,100,200,300) and the tape contains all inflight files from yyddd to yyddd+99. (i.e. 81200-81299)  
\*\*\*\*\*

<<<<<NOTE: ALL LANG SOFTWARE, CATELOGS FORTRAN SOURCE FILES AND COM FILES ARE SUPPLIED ON THE LANG DESCRIPTION TAPE  
LANGDESC>>>>>>

Some LANG supplied software:

To promote data from a tape use PROTAP.COM

To promote all data from the tape answer

'1ST DAY TO BE PROMOTED' with the yyddd of the tape label and 'LAST DAY TO BE PROMOTED' with the same yyddd+99  
(i.e. 82000 and 82099 for tape I82000 and even  
82300 and 82399 for tape I82300)

To promote less than the entire tape answer

'1ST DAY...' and 'LAST DAY...' as per required data  
(i.e. 82342 and 82345 for days 82342-82345)

Once online, to read inflight data into a formatted file

use EXAMLANG.EXE which uses subroutines from  
LANGSUBROUTINES.OBJ (INFL\_READ, INFL\_CONVERT, INF\_VGET, FNE, FNI, FNENI)  
EXAMLANG is the driver which, interactively, gathers the request parameters (date, start time,...) and formats the output (to file or screen).

INFL\_READ opens the appropriate data file, reads the packed integer data, and places the unpacked (real & integer) data in an array for the calling program (i.e. EXAMLANG)

INFL\_CONVERT unpacks the integer data and applies INF\_VGET  
INFL\_VGET transforms the integer data (as stored in TM) into the real and integer temperatures, densities, etc. that it represents using the functions FNE and FNI for Ne and Ni calculations

Thus programs needed are:

PROTAP.COM and

EXAMLANG.EXE or EXAMLANG.FOR, and LANGSUBROUTINES.FOR

to be compiled and linked appropriately.

Once linked EXAMLANG.EXE looks for the I-file(s) in SYS\$MAF and tries to write out any saved data file in SYS\$PROC therefore the two following assignments need to be made prior to running EXAMLANG or using PROTAP.COM

```
ASSIGN <your I-file destination directory> SYS$MAF
ASSIGN <saved data destination directory> SYS$PROC
```

Now you are ready to run.

```
*****
```

The data files themselves:

File names are of the form Iyyddd where yy is 81, 82, or 83 and 0<ddd<366. The date range is 81215-83049 with almost all days represented.

Files are indexed organization using time in milliseconds as the key. A typical OPEN statement is

```
OPEN(UNIT=1,NAME='disk:[directory]Iyyddd.DAT',TYPE='OLD',
      ACCESS='KEYED',KEY=(1:4:INTEGER),RECL=35,READONLY,
      FORM='UNFORMATTED',ORGANIZATION='INDEXED',ERR=label1)
```

File records are 35 (4-byte) words in length (note RECL above) and cover 8 seconds (16 half-sec. samples) of data. The first word is overhead for the keyed-indexed organization. The second word is universal time in msec. of the first half-second of data in the record. The remaining 33 words are the data, in a packed integer form, covering 16 half-second-resolution samples that begin at that UT (call them DATA(1)-DATA(33)). Thus a typical initial (keyed) READ statement is

```
READ(1,KEYGE=SOME_UT,ERR=label2) ITIME, (IDATA(J),J=1,33)
```

This will read the first record with ITIME>=SOME\_UT (both times being in msec). Subsequent READ statements can read sequentially by removing the phrase KEYGE=SOME\_UT, possibly adding END=label3. The 3rd through 35th words of the record comprise the data. The 3rd word (IDATA(1) above) is satellite specific data (IMODE(1-2), IDED, IBIAS, ICMD, IANA, and ION) packed as follows  
((((IMODE(1)\*4+IMODE(2))\*4+IDEDED)\*4+IBIAS)\*2+ICMD)\*4+IANA)\*2+ION  
As implied, these seven data are 1 or 2 bit fields.

IMODE(1:2) 2 bits, mode of each of the two probes

- = 0 adapt
- = 1 step
- = 2 ion hold
- = 3 electron hold

IDED 2 bits, which probe is dedicated

IBIAS 2 bits, indicates the extra bias potential applied to the sweep is not used (SHOULD BE!!!!!!)

ICMD 1 bit, command not used

IANA 2 bits, which probe is analog

ION 1 bit, probe on?

The 4th through 35th words of the record are paired up (i.e. IDATA(2) and IDATA(3), IDATA(4) and IDATA(5), ..., IDATA(32) and IDATA(33)) so that the 16 pairs cover the 16 half-seconds of data in the 8-second interval. These pairs are packed as follows

```
IDATA(2i)=((DV(1)*1024)+DV(2))*1024+NI(1)
          +1           {if NI(1) is negative}
          +1024        {if DV(2) is negative}
          +1024**2     {if DV(1) is negative}
```

where i=1,2,3,...,16

```
IDATA(2i+1)=((NI(2)*256)+IV)*1024+N
          +1           {if N=max(NE(1),NE(2)) is negative}
          +1024        {if IV=max(V(1),V(2)) is negative}
          +1024*256    {if NI(2) is negative}
```

where i=1,2,3,...,16

These are 8 or 10 bit data fields

V(1:2) 8 bits, VA start of sweep potential

DV(1:2) 10 bits, VA slope for this sweep, Te of last sweep  
NI(1:2) 10 bits, Current detector range used in this  
sweep, 2 bits for decade range, 8 bits  
for vernier range  
NE(1:2) 10 bits, decade range (2 bits) and curve amplitude  
(8 bits) giving electron current

The aforementioned subroutines INFL\_CONVER and INF\_VGET are  
THE algorithms for, respectively, the unpacking and  
translation of this array (DATA) of packed integers.

CCSDXKNM0002EMRK0003CCSDXKNM0002SMRK0005

LOG\_VOL\_TIME\_COVERAGE: YYYY-MM-DD TO YYYY-MM-DD

NAMING\_CONVENTION:

File names are of the form Iyyddd where yy is 81, 82, or 83 and  
0<ddd<366. The date range is 81215-83049 with almost all days  
represented.

FILE\_TIME\_COVERAGE:

The times of the data segments in the I-files are contained in  
ILANG.CAT, while the list of the I-files is in LANGTAPELIST.DAT.  
These two files are on the LANG description tape LANGDESC.

PREV\_LOG\_VOL\_COVERAGE: NONE

CCSDXKNM0002EMRK0005CCSDXRNM0003SMRK0006

NESTING= L

REF= FORMAT.SFD

CCSDXRNM0003EMRK0006CCSDXRNL0003SMRK0007

ADI= NSSD0005

CLASS= I

NESTING= N

SCOPE= EACH

REF=N\*.\*

CCSDXRNL0003EMRK0007CCSDXZLM0001EMARK001

DE-B  
81-070B-C9D  
LANGI Data Tapes

Dynamics Explorer 2

LANG Data Tapes

81-070B-09D

The Lang data set consists of 7 tapes. The D tapes are 9 track 6250 BPI. The C tapes are 3480 cartridges. The tapes are written in Backup format, with keyed-indexed files. The D and C numbers, label name, and time spans follow:

D #	C #	Label Name	Time Span
-----	-----	-----	-----
D-80458	C-29156	I81200	07/19/81 - 10/26/81
D-80459	C-29157	I81300	10/27/81 - 12/31/81
D-80460	C-29158	I82000	01/01/82 - 04/29/82
D-80461	C-29159	I82100	04/10/82 - 07/18/82
D-80462	C-29160	I82200	07/19/82 - 10/26/82
D-80463	C-29161	I82300	10/26/82 - 12/31/82
D-80464	C-29162	I83000	01/01/83 - 02/18/83

TAPELIST.DAT LISTING OF THE 7 6250 LANG I-FILE TAPES  
The 7 tapes have the labels: I81200, I81300, I82000, I82100, I82200, I82300,  
I8300.  
The inclusive dates of the LANG data is: 81215-83049  
Listing of save set(s)

Save set: I81200.  
Written by: GRAHAM  
UIC: [000150,000006]  
Date: 22-SEP-1989 10:16:33.90  
Command: BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I81\*\*\*.DAT; MSA0:I81200./LABEL=I81200  
Operating system: VAX/VMS version V4.7  
BACKUP version: V4.7  
CPU ID register: 08000000  
Node name: \_DEIO::  
Written on: \_MSA0:  
Block size: 8192  
Group size: 10  
Buffer count: 3

[POSEY.DEBASE]I81215.DAT;1	84	9-JAN-1985	16:07
[POSEY.DEBASE]I81216.DAT;1	1299	26-SEP-1984	10:27
[POSEY.DEBASE]I81217.DAT;1	594	26-SEP-1984	10:31
[POSEY.DEBASE]I81218.DAT;1	1281	26-SEP-1984	10:25
[POSEY.DEBASE]I81219.DAT;1	1794	26-SEP-1984	10:28
[POSEY.DEBASE]I81220.DAT;1	1782	26-SEP-1984	10:21
[POSEY.DEBASE]I81221.DAT;1	852	26-SEP-1984	10:26
[POSEY.DEBASE]I81222.DAT;1	1314	28-SEP-1984	13:35
[POSEY.DEBASE]I81223.DAT;1	2127	15-JAN-1985	10:13
[POSEY.DEBASE]I81224.DAT;1	738	15-JAN-1985	10:15
[POSEY.DEBASE]I81225.DAT;1	1602	26-SEP-1984	10:25
[POSEY.DEBASE]I81226.DAT;1	531	15-JAN-1985	10:14
[POSEY.DEBASE]I81227.DAT;1	918	26-SEP-1984	10:24
[POSEY.DEBASE]I81228.DAT;1	1014	26-SEP-1984	10:24
[POSEY.DEBASE]I81229.DAT;2	927	20-AUG-1984	10:28
[POSEY.DEBASE]I81230.DAT;2	1044	20-AUG-1984	10:29
[POSEY.DEBASE]I81231.DAT;2	1164	20-AUG-1984	10:29
[POSEY.DEBASE]I81232.DAT;1	1338	28-SEP-1984	13:38
[POSEY.DEBASE]I81233.DAT;1	987	28-SEP-1984	13:32
[POSEY.DEBASE]I81234.DAT;1	1830	28-SEP-1984	13:37
[POSEY.DEBASE]I81235.DAT;2	1617	20-AUG-1984	10:31
[POSEY.DEBASE]I81236.DAT;2	1002	20-AUG-1984	10:31
[POSEY.DEBASE]I81237.DAT;2	711	20-AUG-1984	10:32
[POSEY.DEBASE]I81238.DAT;2	513	20-AUG-1984	10:33
[POSEY.DEBASE]I81239.DAT;2	1164	20-AUG-1984	10:34
[POSEY.DEBASE]I81240.DAT;1	1473	28-SEP-1984	13:34
[POSEY.DEBASE]I81241.DAT;1	111	28-SEP-1984	13:31
[POSEY.DEBASE]I81242.DAT;1	309	18-JAN-1985	15:06
[POSEY.DEBASE]I81243.DAT;1	3216	18-JAN-1985	15:03
[POSEY.DEBASE]I81244.DAT;1	1689	18-JAN-1985	15:02
[POSEY.DEBASE]I81245.DAT;1	543	18-JAN-1985	15:09
[POSEY.DEBASE]I81247.DAT;2	1188	20-AUG-1984	10:43
[POSEY.DEBASE]I81248.DAT;1	981	2-OCT-1984	13:43
[POSEY.DEBASE]I81249.DAT;1	1110	2-OCT-1984	13:29
[POSEY.DEBASE]I81250.DAT;1	1494	2-OCT-1984	13:31
[POSEY.DEBASE]I81251.DAT;1	1557	2-OCT-1984	13:24
[POSEY.DEBASE]I81252.DAT;1	1395	2-OCT-1984	13:27
[POSEY.DEBASE]I81253.DAT;1	1014	2-OCT-1984	13:39
[POSEY.DEBASE]I81254.DAT;1	1182	2-OCT-1984	13:35
[POSEY.DEBASE]I81255.DAT;1	1179	2-OCT-1984	13:24
[POSEY.DEBASE]I81256.DAT;1	1161	2-OCT-1984	13:28
[POSEY.DEBASE]I81257.DAT;1	1083	2-OCT-1984	13:40
[POSEY.DEBASE]I81258.DAT;1	828	2-OCT-1984	13:42
[POSEY.DEBASE]I81259.DAT;1	1158	2-OCT-1984	13:36
[POSEY.DEBASE]I81260.DAT;1	1044	2-OCT-1984	13:26
[POSEY.DEBASE]I81261.DAT;1	1095	2-OCT-1984	13:32

[POSEY.DEBASE]I81262.DAT;1	1509	2-OCT-1984	13:22
[POSEY.DEBASE]I81263.DAT;1	1335	2-OCT-1984	13:38
[POSEY.DEBASE]I81264.DAT;1	1530	31-JAN-1985	17:15
[POSEY.DEBASE]I81265.DAT;1	1329	31-JAN-1985	17:08
[POSEY.DEBASE]I81266.DAT;1	1344	31-JAN-1985	17:10
[POSEY.DEBASE]I81267.DAT;1	942	31-JAN-1985	17:14
[POSEY.DEBASE]I81268.DAT;1	1890	31-JAN-1985	14:30
[POSEY.DEBASE]I81269.DAT;1	1728	31-JAN-1985	14:33
[POSEY.DEBASE]I81270.DAT;1	1497	31-JAN-1985	17:09
[POSEY.DEBASE]I81271.DAT;1	1134	31-JAN-1985	17:16
[POSEY.DEBASE]I81272.DAT;1	1281	31-JAN-1985	17:11
[POSEY.DEBASE]I81273.DAT;1	1512	31-JAN-1985	14:35
[POSEY.DEBASE]I81274.DAT;1	1476	31-JAN-1985	17:13
[POSEY.DEBASE]I81275.DAT;1	2148	31-JAN-1985	14:36
[POSEY.DEBASE]I81276.DAT;1	1353	31-JAN-1985	17:11
[POSEY.DEBASE]I81277.DAT;1	1683	31-JAN-1985	14:42
[POSEY.DEBASE]I81278.DAT;1	1455	31-JAN-1985	17:06
[POSEY.DEBASE]I81279.DAT;1	1893	31-JAN-1985	14:43
[POSEY.DEBASE]I81280.DAT;1	1692	11-OCT-1984	10:08
[POSEY.DEBASE]I81281.DAT;2	2007	20-AUG-1984	11:05
[POSEY.DEBASE]I81282.DAT;1	1620	11-OCT-1984	10:09
[POSEY.DEBASE]I81283.DAT;2	1518	20-AUG-1984	11:10
[POSEY.DEBASE]I81284.DAT;2	1272	20-AUG-1984	11:10
[POSEY.DEBASE]I81285.DAT;2	1749	20-AUG-1984	11:11
[POSEY.DEBASE]I81286.DAT;2	1617	20-AUG-1984	11:12
[POSEY.DEBASE]I81287.DAT;2	2271	20-AUG-1984	11:13
[POSEY.DEBASE]I81288.DAT;2	1266	20-AUG-1984	11:16
[POSEY.DEBASE]I81289.DAT;2	2331	20-AUG-1984	11:19
[POSEY.DEBASE]I81290.DAT;2	1284	20-AUG-1984	11:24
[POSEY.DEBASE]I81291.DAT;2	1590	20-AUG-1984	11:25
[POSEY.DEBASE]I81292.DAT;2	2388	20-AUG-1984	11:27
[POSEY.DEBASE]I81293.DAT;2	2976	20-AUG-1984	11:31
[POSEY.DEBASE]I81294.DAT;2	2274	20-AUG-1984	11:32
[POSEY.DEBASE]I81295.DAT;2	1758	20-AUG-1984	11:33
[POSEY.DEBASE]I81296.DAT;2	2610	20-AUG-1984	11:35
[POSEY.DEBASE]I81297.DAT;2	1998	20-AUG-1984	11:38
[POSEY.DEBASE]I81298.DAT;2	2892	20-AUG-1984	11:40
[POSEY.DEBASE]I81299.DAT;2	2391	20-AUG-1984	11:42

Total of 84 files, 119580 blocks  
End of save set

#### Listing of save set(s)

Save set:	I81300.
Written by:	GRAHAM
UIC:	[000150,000006]
Date:	20-SEP-1989 09:56:28.26
Command:	BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I813%?.DAT; MSA0:I81300./LABEL=I81300
Operating system:	VAX/VMS version V4.7
BACKUP version:	V4.7
CPU ID register:	08000000
Node name:	_DEIO::
Written on:	_MSA0:
Block size:	8192
Group size:	10
Buffer count:	3

[POSEY.DEBASE]I81300.DAT;2	1839	20-AUG-1984	11:45
[POSEY.DEBASE]I81301.DAT;2	1338	20-AUG-1984	12:53
[POSEY.DEBASE]I81302.DAT;2	1710	20-AUG-1984	12:55
[POSEY.DEBASE]I81303.DAT;2	1371	20-AUG-1984	12:58
[POSEY.DEBASE]I81304.DAT;2	1593	20-AUG-1984	12:59
[POSEY.DEBASE]I81305.DAT;2	1455	20-AUG-1984	13:01
[POSEY.DEBASE]I81306.DAT;2	1590	20-AUG-1984	13:02
[POSEY.DEBASE]I81307.DAT;2	1614	20-AUG-1984	13:04
[POSEY.DEBASE]I81308.DAT;2	1398	20-AUG-1984	13:06

[POSEY.DEBASE]I81309.DAT;2	1596	20-AUG-1984	13:09
[POSEY.DEBASE]I81310.DAT;2	1152	20-AUG-1984	13:11
[POSEY.DEBASE]I81311.DAT;2	1179	20-AUG-1984	13:12
[POSEY.DEBASE]I81312.DAT;2	1548	20-AUG-1984	13:14
[POSEY.DEBASE]I81313.DAT;2	1410	20-AUG-1984	13:15
[POSEY.DEBASE]I81314.DAT;2	1332	20-AUG-1984	13:17
[POSEY.DEBASE]I81315.DAT;2	1443	20-AUG-1984	13:18
[POSEY.DEBASE]I81316.DAT;2	1842	20-AUG-1984	13:22
[POSEY.DEBASE]I81317.DAT;2	1560	20-AUG-1984	13:24
[POSEY.DEBASE]I81318.DAT;2	1695	20-AUG-1984	13:24
[POSEY.DEBASE]I81319.DAT;2	1791	20-AUG-1984	13:27
[POSEY.DEBASE]I81320.DAT;2	1437	20-AUG-1984	13:29
[POSEY.DEBASE]I81321.DAT;2	1485	20-AUG-1984	13:37
[POSEY.DEBASE]I81322.DAT;2	2073	20-AUG-1984	13:41
[POSEY.DEBASE]I81323.DAT;2	2472	20-AUG-1984	13:44
[POSEY.DEBASE]I81324.DAT;2	1419	20-AUG-1984	13:49
[POSEY.DEBASE]I81325.DAT;2	1659	20-AUG-1984	13:53
[POSEY.DEBASE]I81326.DAT;2	1566	20-AUG-1984	13:54
[POSEY.DEBASE]I81327.DAT;2	1629	20-AUG-1984	13:56
[POSEY.DEBASE]I81328.DAT;2	1047	20-AUG-1984	13:58
[POSEY.DEBASE]I81329.DAT;2	1596	20-AUG-1984	13:59
[POSEY.DEBASE]I81330.DAT;2	1953	20-AUG-1984	14:00
[POSEY.DEBASE]I81331.DAT;2	1389	20-AUG-1984	14:02
[POSEY.DEBASE]I81332.DAT;2	2269	20-AUG-1984	14:03
[POSEY.DEBASE]I81333.DAT;2	1404	20-AUG-1984	14:06
[POSEY.DEBASE]I81334.DAT;2	1878	20-AUG-1984	14:08
[POSEY.DEBASE]I81335.DAT;2	1689	20-AUG-1984	14:10
[POSEY.DEBASE]I81336.DAT;2	1281	20-AUG-1984	14:12
[POSEY.DEBASE]I81337.DAT;2	1845	20-AUG-1984	14:14
[POSEY.DEBASE]I81338.DAT;2	1830	20-AUG-1984	14:16
[POSEY.DEBASE]I81339.DAT;2	2325	20-AUG-1984	14:19
[POSEY.DEBASE]I81340.DAT;2	2214	20-AUG-1984	14:22
[POSEY.DEBASE]I81341.DAT;2	2523	20-AUG-1984	15:48
[POSEY.DEBASE]I81342.DAT;2	2199	20-AUG-1984	15:54
[POSEY.DEBASE]I81343.DAT;2	1965	20-AUG-1984	15:59
[POSEY.DEBASE]I81344.DAT;2	1767	20-AUG-1984	16:05
[POSEY.DEBASE]I81345.DAT;2	2145	20-AUG-1984	16:13
[POSEY.DEBASE]I81346.DAT;2	1623	20-AUG-1984	16:18
[POSEY.DEBASE]I81347.DAT;2	2904	20-AUG-1984	16:21
[POSEY.DEBASE]I81348.DAT;2	2388	20-AUG-1984	16:27
[POSEY.DEBASE]I81349.DAT;2	1716	20-AUG-1984	16:31
[POSEY.DEBASE]I81350.DAT;2	1692	20-AUG-1984	16:31
[POSEY.DEBASE]I81351.DAT;2	2142	20-AUG-1984	16:33
[POSEY.DEBASE]I81352.DAT;2	2244	20-AUG-1984	16:35
[POSEY.DEBASE]I81353.DAT;2	1938	20-AUG-1984	16:38
[POSEY.DEBASE]I81354.DAT;2	1722	20-AUG-1984	16:38
[POSEY.DEBASE]I81355.DAT;2	2307	20-AUG-1984	16:40
[POSEY.DEBASE]I81356.DAT;2	2091	20-AUG-1984	16:44
[POSEY.DEBASE]I81357.DAT;2	2631	20-AUG-1984	16:47
[POSEY.DEBASE]I81358.DAT;2	1815	20-AUG-1984	16:52
[POSEY.DEBASE]I81359.DAT;2	1245	20-AUG-1984	16:56
[POSEY.DEBASE]I81360.DAT;2	1581	20-AUG-1984	16:58
[POSEY.DEBASE]I81361.DAT;2	1185	20-AUG-1984	17:12
[POSEY.DEBASE]I81362.DAT;2	1752	20-AUG-1984	17:14
[POSEY.DEBASE]I81363.DAT;2	1341	20-AUG-1984	17:15
[POSEY.DEBASE]I81364.DAT;2	1296	20-AUG-1984	17:17
[POSEY.DEBASE]I81365.DAT;2	1362	20-AUG-1984	17:20

Total of 66 files, 114490 blocks  
End of save set

Listing of save set(s)

Save set: I82000.  
Written by: GRAHAM  
UIC: [000150,000006]  
Date: 20-SEP-1989 11:07:02.02

Command: BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I82000.DAT; MSA0:I82000./LABEL=I82000  
Operating system: VAX/VMS version V4.7  
BACKUP version: V4.7  
CPU ID register: 08000000  
Node name: \_DEIO::  
Written on: \_MSA0:  
Block size: 8192  
Group size: 10  
Buffer count: 3

[POSEY.DEBASE]I82001.DAT;2	1890	22-AUG-1984	09:55
[POSEY.DEBASE]I82002.DAT;2	1704	22-AUG-1984	09:57
[POSEY.DEBASE]I82003.DAT;2	2049	22-AUG-1984	09:58
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[POSEY.DEBASE]I82005.DAT;2	1368	22-AUG-1984	10:03
[POSEY.DEBASE]I82006.DAT;2	1773	22-AUG-1984	10:04
[POSEY.DEBASE]I82007.DAT;2	2277	22-AUG-1984	10:06
[POSEY.DEBASE]I82008.DAT;2	1746	22-AUG-1984	10:09
[POSEY.DEBASE]I82009.DAT;2	1623	22-AUG-1984	10:11
[POSEY.DEBASE]I82010.DAT;2	1137	22-AUG-1984	10:13
[POSEY.DEBASE]I82011.DAT;2	876	22-AUG-1984	10:15
[POSEY.DEBASE]I82012.DAT;2	1164	22-AUG-1984	10:17
[POSEY.DEBASE]I82013.DAT;2	1224	22-AUG-1984	10:19
[POSEY.DEBASE]I82014.DAT;2	1473	22-AUG-1984	10:20
[POSEY.DEBASE]I82015.DAT;2	1176	22-AUG-1984	10:22
[POSEY.DEBASE]I82016.DAT;2	1260	22-AUG-1984	10:24
[POSEY.DEBASE]I82017.DAT;2	1128	22-AUG-1984	10:25
[POSEY.DEBASE]I82018.DAT;2	1046	22-AUG-1984	10:27
[POSEY.DEBASE]I82019.DAT;2	1278	22-AUG-1984	10:29
[POSEY.DEBASE]I82020.DAT;2	1758	22-AUG-1984	10:31
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[POSEY.DEBASE]I82072.DAT;1	843	3-DEC-1984	13:59
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[POSEY.DEBASE]I82075.DAT;2	1278	22-AUG-1984	11:41
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[POSEY.DEBASE]I82078.DAT;2	1470	22-AUG-1984	11:44
[POSEY.DEBASE]I82079.DAT;2	1425	22-AUG-1984	11:45
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[POSEY.DEBASE]I82081.DAT;1	945	10-DEC-1984	16:21
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[POSEY.DEBASE]I82092.DAT;1	996	10-DEC-1984	16:25
[POSEY.DEBASE]I82093.DAT;1	1014	10-DEC-1984	16:24
[POSEY.DEBASE]I82094.DAT;1	1248	10-DEC-1984	16:23
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[POSEY.DEBASE]I82096.DAT;1	1278	11-DEC-1984	21:22
[POSEY.DEBASE]I82097.DAT;1	1110	1-JUL-1985	13:42
[POSEY.DEBASE]I82098.DAT;1	1503	11-DEC-1984	21:18
[POSEY.DEBASE]I82099.DAT;1	1131	11-DEC-1984	21:22

Total of 98 files, 131552 blocks  
End of save set

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Save set:	I82100.
Written by:	GRAHAM
UIC:	[000150,000006]
Date:	20-SEP-1989 14:07:23.49
Command:	BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I821%?.DAT; MSA0:I82100./LABEL=I82100
Operating system:	VAX/VMS version V4.7
BACKUP version:	V4.7
CPU ID register:	08000000
Node name:	_DEIO::
Written on:	_MSA0:
Block size:	8192
Group size:	10
Buffer count:	3

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[POSEY.DEBASE]I82101.DAT;1	999	11-DEC-1984	21:20
[POSEY.DEBASE]I82102.DAT;1	1263	11-DEC-1984	21:19
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[POSEY.DEBASE]I82104.DAT;2	1551	22-AUG-1984	12:53

[POSEY.DEBASE]I82105.DAT;2	1731	22-AUG-1984	12:53
[POSEY.DEBASE]I82106.DAT;1	1395	12-DEC-1984	14:05
[POSEY.DEBASE]I82107.DAT;1	1791	12-DEC-1984	14:11
[POSEY.DEBASE]I82108.DAT;1	1464	12-DEC-1984	14:11
[POSEY.DEBASE]I82109.DAT;2	1482	22-AUG-1984	12:54
[POSEY.DEBASE]I82110.DAT;2	1590	22-AUG-1984	12:55
[POSEY.DEBASE]I82111.DAT;1	870	12-DEC-1984	14:13
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[POSEY.DEBASE]I82118.DAT;1	1557	13-DEC-1984	17:50
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[POSEY.DEBASE]I82179.DAT;1	1644	7-MAY-1985	10:31
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Total of 100 files, 150951 blocks  
End of save set

#### Listing of save set(s)

Save set:	I82200.
Written by:	CRAHAM
UIC:	[000150,000006]
Date:	20-SEP-1989 15:54:52.68
Command:	BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I82200.DAT; MSA0:I82200./LABEL=I82200
Operating system:	VAX/VMS version V4.7
BACKUP version:	V4.7
CPU ID register:	08000000
Node name:	_DEIO::
Written on:	_MSA0:
Block size:	8192
Group size:	10
Buffer count:	3

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[POSEY.DEBASE]I82265.DAT;1	1383 23-AUG-1984 09:24
[POSEY.DEBASE]I82266.DAT;1	2385 23-AUG-1984 09:25
[POSEY.DEBASE]I82267.DAT;1	1050 23-AUG-1984 09:26
[POSEY.DEBASE]I82268.DAT;1	1101 23-AUG-1984 09:27
[POSEY.DEBASE]I82269.DAT;1	1047 23-AUG-1984 09:29
[POSEY.DEBASE]I82270.DAT;1	849 23-AUG-1984 09:30
[POSEY.DEBASE]I82271.DAT;1	1044 23-AUG-1984 09:31
[POSEY.DEBASE]I82272.DAT;1	1482 23-AUG-1984 09:32
[POSEY.DEBASE]I82273.DAT;1	1266 23-AUG-1984 09:34
[POSEY.DEBASE]I82274.DAT;1	903 23-AUG-1984 09:35
[POSEY.DEBASE]I82275.DAT;1	1335 23-AUG-1984 09:36
[POSEY.DEBASE]I82276.DAT;1	708 23-AUG-1984 09:38
[POSEY.DEBASE]I82277.DAT;1	1026 23-AUG-1984 09:38
[POSEY.DEBASE]I82278.DAT;2	1440 23-AUG-1984 09:40
[POSEY.DEBASE]I82279.DAT;2	1518 16-AUG-1984 10:33
[POSEY.DEBASE]I82280.DAT;1	1512 28-AUG-1984 14:16
[POSEY.DEBASE]I82281.DAT;1	1326 28-AUG-1984 14:16
[POSEY.DEBASE]I82282.DAT;1	1362 28-AUG-1984 14:15
[POSEY.DEBASE]I82283.DAT;1	1740 28-AUG-1984 14:16
[POSEY.DEBASE]I82284.DAT;2	1602 17-AUG-1984 11:02

[POSEY.DEBASE]I82285.DAT;2  
[POSEY.DEBASE]I82286.DAT;2  
[POSEY.DEBASE]I82287.DAT;2  
[POSEY.DEBASE]I82288.DAT;2  
[POSEY.DEBASE]I82289.DAT;2  
[POSEY.DEBASE]I82290.DAT;2  
[POSEY.DEBASE]I82291.DAT;2  
[POSEY.DEBASE]I82292.DAT;1  
[POSEY.DEBASE]I82293.DAT;1  
[POSEY.DEBASE]I82294.DAT;1  
[POSEY.DEBASE]I82295.DAT;1  
[POSEY.DEBASE]I82296.DAT;1  
[POSEY.DEBASE]I82297.DAT;1  
[POSEY.DEBASE]I82298.DAT;1  
[POSEY.DEBASE]I82299.DAT;1

1668 17-AUG-1984 10:55  
1230 17-AUG-1984 11:09  
1710 17-AUG-1984 11:07  
1824 17-AUG-1984 10:59  
1056 27-AUG-1984 09:18  
1428 27-AUG-1984 09:18  
1737 27-AUG-1984 09:16  
1263 28-AUG-1984 14:25  
1707 28-AUG-1984 14:26  
1389 31-AUG-1984 09:16  
1602 28-AUG-1984 14:28  
1302 28-AUG-1984 14:26  
1314 28-AUG-1984 14:27  
1560 28-AUG-1984 14:28  
1578 31-AUG-1984 09:19

Total of 99 files, 127848 blocks  
End of save set

Listing of save set(s)

Save set: 182300.  
Written by: GRAHAM  
UIC: [000150,000006]  
Date: 21-SEP-1989 14:39:41.08  
Command: BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I82300.DAT; MSA0:I82300./LABEL=I82300  
Operating system: VAX/VMS version V4.7  
BACKUP version: V4.7  
CPU ID register: 08000000  
Node name: \_DEIO::  
Written on: \_MSA0:  
Block size: 8192  
Group size: 10  
Buffer count: 3

[POSEY.DEBASE]I82300.DAT;1  
[POSEY.DEBASE]I82301.DAT;1  
[POSEY.DEBASE]I82302.DAT;1  
[POSEY.DEBASE]I82303.DAT;1  
[POSEY.DEBASE]I82304.DAT;1  
[POSEY.DEBASE]I82305.DAT;1  
[POSEY.DEBASE]I82306.DAT;1  
[POSEY.DEBASE]I82307.DAT;1  
[POSEY.DEBASE]I82308.DAT;1  
[POSEY.DEBASE]I82309.DAT;1  
[POSEY.DEBASE]I82310.DAT;1  
[POSEY.DEBASE]I82311.DAT;1  
[POSEY.DEBASE]I82312.DAT;1  
[POSEY.DEBASE]I82313.DAT;1  
[POSEY.DEBASE]I82314.DAT;1  
[POSEY.DEBASE]I82315.DAT;1  
[POSEY.DEBASE]I82316.DAT;1  
[POSEY.DEBASE]I82317.DAT;1  
[POSEY.DEBASE]I82318.DAT;1  
[POSEY.DEBASE]I82319.DAT;1  
[POSEY.DEBASE]I82320.DAT;1  
[POSEY.DEBASE]I82321.DAT;1  
[POSEY.DEBASE]I82322.DAT;1  
[POSEY.DEBASE]I82323.DAT;1  
[POSEY.DEBASE]I82324.DAT;2  
[POSEY.DEBASE]I82325.DAT;2  
[POSEY.DEBASE]I82326.DAT;2  
[POSEY.DEBASE]I82327.DAT;2  
[POSEY.DEBASE]I82328.DAT;1  
[POSEY.DEBASE]I82329.DAT;2  
[POSEY.DEBASE]I82330.DAT;2  
[POSEY.DEBASE]I82331.DAT;1

1308 31-AUG-1984 09:13  
1641 31-AUG-1984 09:14  
1593 31-AUG-1984 09:15  
1488 23-SEP-1985 16:03  
1383 31-AUG-1984 09:13  
1647 31-AUG-1984 09:20  
1521 31-AUG-1984 09:22  
1716 31-AUG-1984 09:21  
1389 31-AUG-1984 09:12  
1593 31-AUG-1984 09:09  
1413 31-AUG-1984 09:11  
1677 31-AUG-1984 09:12  
1593 31-AUG-1984 09:10  
1656 31-AUG-1984 09:10  
1797 10-SEP-1984 10:45  
1137 10-SEP-1984 10:55  
1980 10-SEP-1984 10:46  
774 10-SEP-1984 10:54  
1380 10-SEP-1984 10:48  
1167 10-SEP-1984 10:53  
1545 10-SEP-1984 10:47  
1908 10-SEP-1984 10:51  
1578 19-SEP-1984 11:18  
1512 19-SEP-1984 11:17  
1041 23-AUG-1984 09:52  
1557 23-AUG-1984 09:53  
1167 23-AUG-1984 09:55  
1440 23-AUG-1984 09:57  
2130 19-SEP-1984 11:19  
3519 23-AUG-1984 09:58  
2661 23-AUG-1984 09:59  
1731 19-SEP-1984 11:19

[POSEY.DEBASE]I82332.DAT;1	1920	10-SEP-1984	11:35
[POSEY.DEBASE]I82333.DAT;1	2037	10-SEP-1984	10:48
[POSEY.DEBASE]I82334.DAT;1	1650	20-AUG-1985	14:05
[POSEY.DEBASE]I82335.DAT;1	1215	20-AUG-1985	14:03
[POSEY.DEBASE]I82336.DAT;1	1425	26-SEP-1984	10:30
[POSEY.DEBASE]I82337.DAT;1	1209	26-SEP-1984	10:27
[POSEY.DEBASE]I82338.DAT;1	1785	26-SEP-1984	10:24
[POSEY.DEBASE]I82339.DAT;1	1797	20-AUG-1985	14:03
[POSEY.DEBASE]I82340.DAT;2	1491	23-AUG-1984	10:05
[POSEY.DEBASE]I82341.DAT;1	1035	13-DEC-1984	17:04
[POSEY.DEBASE]I82342.DAT;1	1788	13-DEC-1984	17:03
[POSEY.DEBASE]I82343.DAT;1	1302	13-DEC-1984	17:03
[POSEY.DEBASE]I82344.DAT;1	1539	13-DEC-1984	17:02
[POSEY.DEBASE]I82345.DAT;1	1563	13-DEC-1984	17:02
[POSEY.DEBASE]I82346.DAT;1	1761	17-DEC-1984	14:30
[POSEY.DEBASE]I82347.DAT;1	1500	17-DEC-1984	14:27
[POSEY.DEBASE]I82348.DAT;1	945	17-DEC-1984	14:32
[POSEY.DEBASE]I82349.DAT;1	1614	17-DEC-1984	14:25
[POSEY.DEBASE]I82350.DAT;1	1266	17-DEC-1984	14:24
[POSEY.DEBASE]I82351.DAT;1	837	17-DEC-1984	14:26
[POSEY.DEBASE]I82352.DAT;1	1134	17-DEC-1984	14:31
[POSEY.DEBASE]I82353.DAT;1	1215	17-DEC-1984	14:29
[POSEY.DEBASE]I82354.DAT;1	1320	20-DEC-1984	10:00
[POSEY.DEBASE]I82355.DAT;1	1308	20-DEC-1984	10:05
[POSEY.DEBASE]I82356.DAT;1	759	20-DEC-1984	10:02
[POSEY.DEBASE]I82357.DAT;1	1380	20-DEC-1984	10:02
[POSEY.DEBASE]I82358.DAT;1	234	20-DEC-1984	10:08
[POSEY.DEBASE]I82359.DAT;1	681	20-DEC-1984	10:05
[POSEY.DEBASE]I82360.DAT;1	756	20-DEC-1984	10:06
[POSEY.DEBASE]I82361.DAT;1	1641	20-DEC-1984	10:03
[POSEY.DEBASE]I82362.DAT;1	1008	20-DEC-1984	10:03
[POSEY.DEBASE]I82363.DAT;1	1143	20-DEC-1984	10:06
[POSEY.DEBASE]I82364.DAT;1	948	20-DEC-1984	10:07
[POSEY.DEBASE]I82365.DAT;1	1215	20-DEC-1984	10:06

Total of 66 files, 96063 blocks  
End of save set

#### Listing of save set(s)

Save set:	I83000.
Written by:	GRAHAM
UIC:	[000150,000006]
Date:	22-SEP-1989 09:02:39.39
Command:	BACKUP/REW/LOG NADA.DAT,D\$USER:[POSEY.DEBASE]I83000.DAT; MSA0:I83000./LABEL=I83000
Operating system:	VAX/VMS version V4.7
BACKUP version:	V4.7
CPU ID register:	08000000
Node name:	_DEIO::
Written on:	_MSA0:
Block size:	8192
Group size:	10
Buffer count:	3

[POSEY.DEBASE]I83001.DAT;1	834	20-DEC-1984	10:04
[POSEY.DEBASE]I83002.DAT;1	1110	31-DEC-1984	11:16
[POSEY.DEBASE]I83003.DAT;1	750	31-DEC-1984	11:21
[POSEY.DEBASE]I83004.DAT;1	744	31-DEC-1984	11:13
[POSEY.DEBASE]I83005.DAT;1	1113	31-DEC-1984	11:10
[POSEY.DEBASE]I83006.DAT;1	909	12-NOV-1985	16:23
[POSEY.DEBASE]I83007.DAT;1	1212	31-DEC-1984	11:11
[POSEY.DEBASE]I83008.DAT;1	1092	31-DEC-1984	11:13
[POSEY.DEBASE]I83009.DAT;1	732	31-DEC-1984	11:20
[POSEY.DEBASE]I83010.DAT;1	294	22-AUG-1985	11:36
[POSEY.DEBASE]I83011.DAT;1	792	9-JAN-1985	16:07
[POSEY.DEBASE]I83012.DAT;1	864	31-DEC-1984	11:18
[POSEY.DEBASE]I83013.DAT;1	1212	31-DEC-1984	11:13

[POSEY.DEBASE]I83014.DAT;1	573	31-DEC-1984	11:18
[POSEY.DEBASE]I83015.DAT;1	1326	31-DEC-1984	11:15
[POSEY.DEBASE]I83016.DAT;1	993	9-JAN-1985	16:04
[POSEY.DEBASE]I83017.DAT;1	1446	9-JAN-1985	16:00
[POSEY.DEBASE]I83018.DAT;1	1410	9-JAN-1985	15:58
[POSEY.DEBASE]I83019.DAT;1	1527	9-JAN-1985	16:01
[POSEY.DEBASE]I83020.DAT;1	1359	9-JAN-1985	15:59
[POSEY.DEBASE]I83021.DAT;1	1686	9-JAN-1985	16:05
[POSEY.DEBASE]I83022.DAT;1	1437	9-JAN-1985	16:06
[POSEY.DEBASE]I83023.DAT;1	1062	26-FEB-1985	13:16
[POSEY.DEBASE]I83024.DAT;1	1074	26-FEB-1985	13:14
[POSEY.DEBASE]I83025.DAT;1	1356	26-FEB-1985	13:13
[POSEY.DEBASE]I83026.DAT;1	984	26-FEB-1985	13:17
[POSEY.DEBASE]I83027.DAT;1	1167	26-FEB-1985	13:15
[POSEY.DEBASE]I83028.DAT;1	927	26-FEB-1985	13:16
[POSEY.DEBASE]I83029.DAT;1	1041	27-FEB-1985	15:25
[POSEY.DEBASE]I83030.DAT;1	1023	27-FEB-1985	15:25
[POSEY.DEBASE]I83031.DAT;1	1206	28-FEB-1985	15:56
[POSEY.DEBASE]I83032.DAT;1	765	5-MAR-1985	14:38
[POSEY.DEBASE]I83033.DAT;1	915	7-MAR-1985	11:11
[POSEY.DEBASE]I83034.DAT;1	726	7-MAR-1985	11:11
[POSEY.DEBASE]I83035.DAT;1	693	7-MAR-1985	11:12
[POSEY.DEBASE]I83036.DAT;1	567	7-MAR-1985	11:12
[POSEY.DEBASE]I83037.DAT;1	699	23-AUG-1985	09:51
[POSEY.DEBASE]I83038.DAT;1	663	23-AUG-1985	09:54
[POSEY.DEBASE]I83039.DAT;1	522	23-AUG-1985	09:53
[POSEY.DEBASE]I83040.DAT;1	639	8-MAR-1985	14:39
[POSEY.DEBASE]I83041.DAT;1	996	8-MAR-1985	14:36
[POSEY.DEBASE]I83042.DAT;1	864	8-MAR-1985	14:39
[POSEY.DEBASE]I83043.DAT;1	933	8-MAR-1985	14:38
[POSEY.DEBASE]I83044.DAT;1	426	8-MAR-1985	14:37
[POSEY.DEBASE]I83045.DAT;1	837	8-MAR-1985	14:36
[POSEY.DEBASE]I83046.DAT;1	813	8-MAR-1985	14:36
[POSEY.DEBASE]I83047.DAT;1	690	8-MAR-1985	14:38
[POSEY.DEBASE]I83048.DAT;1	705	27-AUG-1985	09:20
[POSEY.DEBASE]I83049.DAT;1	576	11-MAR-1985	09:10

Total of 49 files, 46284 blocks  
End of save set

The LANG volume description file.

This tape, the LANG DESCRIPTION TAPE -- LANGDESC --, will be supplied to the NSSDC well in advance of the delivery of the data tapes. In addition to containing all LANG software, catalogs, FORTRAN source files and com files, this description tape will be documented (contains documentation) to insure that the various programs will be compiled and linked appropriately in producing the required geophysical data.

CCSDXZLM0001SMARK001CCSDXVN0002SMRK0001  
LOG\_VOL\_IDENT: USANASANSSDDEB9\_0001  
LOG\_VOL\_CLOSING\_DATE: 1989-10-31  
LOG\_VOL\_FILE\_STRUCTURE: FILES-11  
TAPE\_DENSITY=6250 BPI  
TAPE\_TRACKS=9  
TAPE\_LENGTH=2400 INCHES  
COMPUTER\_MFGR: DIGITAL EQUIPMENT CORPORATION  
OPERATING\_SYSTEM: MICROVMS 4.7  
COMPUTER\_SYSTEM: MICRO VAX II  
TECHNICAL\_CONTACT: DR. W. R. HOEGY  
CODE 614  
NASA/GSFC  
GREENBELT, MD 20771  
PHONE: 301-286-3837  
SPAN: DE614::, DEIO::HOEGY, PACF::HOEGY

PREV\_VOL\_IDENT: NONE  
CCSDXVN0002EMRK0001CCSDXKNM0002SMRK0003  
DATA\_SET\_NAME: LANG ELECTRON DENSITY AND TEMPERATURE  
DATA\_SOURCES: DYNAMICS EXPLORER B, LANGMUIR PROBE (LANG)  
INVESTIGATOR\_CONTACT: MR. LARRY H. BRACE  
CODE 614  
NASA/GSFC  
GREENBELT, MD 20771  
PHONE: 303-286-8575  
SPAN: DE614::HOEGY

SOURCE\_CHARACTERISTICS:

A. DESCRIPTION\_OF\_SPACECRAFT:

The Dynamics Explorer 2 spacecraft was one of two satellites launched for the Dynamics Explorer program. The two spacecraft were launched together into coplanar polar orbits for the purpose of studying coupling between the magnetosphere, ionosphere, and the atmosphere. The DE-2 spacecraft was placed in a low elliptical orbit whereas the DE-1 orbit was highly elliptical. Instruments aboard the DE-2 spacecraft were: magnetometer, vector electric field instrument, neutral atmosphere composition spectrometer, wind and temperature spectrometer, Fabry-Perot interferometer, ion drift meter, retarding potential analyzer, low altitude plasma instrument, and Langmuir probe.

B. ORBIT\_INFORMATION:

Because the Delta launch vehicle did not complete a full burn the DE-2 satellite was placed in a lower than anticipated polar orbit, initially 1012 by 309 km. The orbital period was 98 min. The DE-1 and DE-2 satellites were launched by the same vehicle so that their orbits would be coplanar, allowing occasional two-point measurements along magnetic field lines. The DE-2 spacecraft spun once per orbit and the spin axis was perpendicular to the orbital plane so that one axis of the satellite always was aligned with the center of the earth.

C. PERFORMANCE:

The DE-2 spacecraft performed well through its lifetime. Power limitations forced the duty cycle to be limited to an average which was originally targeted at 30%. The lifetime of the spacecraft was shorter than anticipated because of the less than nominal performance of the launch vehicle. The launch was on Aug. 3, 1981 and the DE-2 satellite reentered the atmosphere on Feb. 19, 1983, with the last contact the day before.

TIME\_SPAN\_OF\_THE\_DATA: 8-AUG-81 TO 15-JAN-83

INVESTIGATION\_OBJECTIVES:

The LANG objective was to provide electron temperature, plasma density, and spacecraft potential at high resolution of 0.5 seconds to study

energetics of the thermal plasma and density structure of the ionosphere including large scale structures, traveling ionospheric disturbances, and plasma waves.

INSTRUMENT\_ATTRIBUTES:

A. DESCRIPTION\_OF\_INSTRUMENT:

The Dynamics Explorer Langmuir Probe Instrument (LANG) performs in-situ measurements of electron temperature and ion density. Two independent sensors are connected to individual adaptive sweep voltage circuits which continuously track the changing electron temperature and spacecraft potential while autoranging electrometers adjust their gain in response to the changing plasma density. Each voltage sweep takes place in 0.5 seconds. The control signals used to achieve this automatic tracking provide a continuous monitoring of the ionospheric parameters (at 0.5 second resolution) without telemetering each volt-ampere curve. The volt-ampere curves are transmitted twice every 8 seconds (50 samples during one 0.5 second sweep) using digital (10 bit accuracy) stored data. Analog data is digitized by the spacecraft at 8 bit resolution and provides volt-ampere data at 64 samples/second.

During much of the mission probe 1 was in the ion hold mode providing 64 samples/second resolution ion density data via the analog data channel. (See Space Science Instrumentation, Vol 5, 493, 1981).

B. OPERATION\_MODE:

Inflight electron temperature, ion and electron density, and satellite potential are detected every 0.5 second. Two stored volt-ampere curves are detected every 8 seconds, analog volt-ampere curves every 0.5 second at a rate of 64 samples/second. Normal operating mode is: probe 2 in adaptive mode to give electron temperature and ion density; probe 1 in ion hold mode to give high resolution ion density at 64 samples/second.

C. MEASURED\_PARAMETERS:

Electrometer gain and applied voltage (start and slope) settings for every 0.5 second framed volt-ampere sweep are directly sensed. These telemetered engineering parameters are used to derive the inflight values of ion density, electron density, electron temperature, and satellite potential based on calibration with the raw volt-ampere data.

Electrometer gain and applied voltage of volt-ampere curves for stored and analog data channels are telemetered for ground analysis. The geophysical parameters, electron temperature, ion density, satellite potential, and electron density, are derived from this raw volt-ampere data. 64 sample/second ion density is derived from the analog volt-ampere data when probe 1 is in ion hold mode.

D. PERFORMANCE\_OF\_THE\_INSTRUMENT:

The LANG instrument returned usable data from shortly after launch until reentry. During some spinning orbits the instrument was placed in a special stepping mode to calibrate the accelerated electron current. Probe 2 was successfully cleaned and provided accurate electron temperatures throughout the mission. Probe 1 was contaminated and therefore could not provide accurate temperatures; it did provide accurate, high resolution ion densities. Probe 2 was used for the inflight temperature, density, and satellite potential.

E. RESOLUTION:

Each LANG record contains 0.5 second resolution engineering parameters from which the inflight electron temperature, electron and ion density, and satellite potential are derived using simple computer code.

PARAMETERS:

The geophysical parameters derived from the Langmuir probe are electron temperature ( $T_e$ ), plasma density (either ion density  $N_i$  from the ion acceleration region of the probe volt-ampere characteristic when the probe is negative with respect to the plasma and measures ion, and electron density  $N_e$  from the electron acceleration region when the probe is positive and retards the ions and accelerates the electrons) and satellite potential,  $V_s$  which is the potential difference between the probe and the undisturbed ionosphere plasma. These geophysical parameters are derived every 0.5 seconds from a voltage sweep of the probe which generates an internal volt-ampere curve. The curve is framed by adjusting the gain decade and vernier settings so that the accelerated ion current produces an electrometer output voltage of -3.3 volts, the

voltage sweep is adjusted so that the electron current produces an electrometer output voltage of 9.5 volts after a voltage difference of 8kTe from the starting voltage. This frames the volt-ampere curve to maximize the resolution of the temperature and density. The inflight engineering parameters from which Te Ni Ne and Vs are derived are telemetered every 0.5 seconds. The detailed engineering parameters described as follows:

IMODE(1:2) 2 bits, mode of each of the two probes

- = 0 adapt
- = 1 step
- = 2 ion hold
- = 3 electron hold

IDED 2 bits, which probe is dedicated

IBIAS 2 bits, indicates the extra bias potential applied to the sweep, negative, positive, none.

ICMD 1 bit, command, not used

IANA 2 bits, which probe is analog

ION 1 bit, probe on switch

VI(1:2) 8 bits, VA start of sweep potential

DV(1:2) 10 bits, VA slope for this sweep, Te of last sweep

NI(1:2) 10 bits, Current detector range used in this sweep, 2 bits for decade range, 8 bits for vernier range

NE(1:2) 10 bits, decade range (2 bits) and curve amplitude (8 bits) giving electron current

These engineering parameters are converted to the geophysical electron temperature, ion and electron density, and satellite potential using the subroutines contained in the file LANGSUBROUTINES.FOR on tape LANGDESC. Each file contains a functional description clarifying usage.

#### DATA\_SET\_QUALITY:

The electron temperature and ion and electron density are accurate to about 10% at all altitudes. The subroutine supplied in LANGSUBROUTINES.FOR which converts the engineering parameters to geophysical Te Ni Ne and Vs, has built in limits which only produces Te when the density is greater than 1.E4, and which returns Ni when density is above 2.E4 and Ne when density is below 2.E4. The range of Te is from about 800 K to about 10,000 K, the range of Ni and Ne is: 1.E3 to 1.E6 for Ne and 1.E4 to 1.E7 for Ni; Vs has a possible range of about -10 volts to +7 volts, but is typically at -1.5 to -0.5 volts.

#### DATA\_PROCESSING\_OVERVIEW:

##### A. DATA\_PROCESSING\_CYCLE:

The raw telemetry data were routinely converted I-files containing the 0.5 second inflight engineering parameters which are converted by the software in LANGSUBROUTINES.FOR into geophysical parameters Te, Ne and Ni. There is one I-file for each day for which data was taken. Each daily I-file contains the telemetry segments listed on the catalog file LANGTAPELIST.DAT. The start and stop times of the telemetry segments are those of the raw telemetry segments. The files LANGSUBROUTINES.FOR and LANGTAPELIST.DAT are supplied on the LANG document file LANGDESC.

##### B. HISTORY:

The I-files were produced routinely as telemetry became available. Telemetry was rescanned for missing passes at later times. Duplicate passes or parts of passes should have been eliminated and separate segments joined. The extreme segmentation or length of some telemetry passes resulted in the inability of the Sigma 9 to bring all the data on line within the allotted processing time and results in some passes still being incomplete. All files have been updated to final values and written on VAX formatted tapes.

DATA\_USAGE: Data are used to obtain the ambient electron temperature, ion density, electron density, and satellite potential. Lists of times when data is bad due to orbit problems or times when the spacecraft was spinning are listed in the files BADLANG.DAT for the bad data and SPINNERSLANG.DAT for the spinning orbits. These files are on the LANG document tape LANGDESC.

DATA\_ORGANIZATION:

LANGMUIR PROBE INFLIGHT DATA

\*\*\*\*\*

Stored on 7 tapes labeled Iyyddd where ddd is a multiple of  
100 (000,100,200,300) and the tape contains all inflight  
files from yyddd to yyddd+99. (i.e. 81200-81299)

\*\*\*\*\*

<<<<<NOTE: ALL LANG SOFTWARE, CATALOGS FORTRAN SOURCE FILES AND  
COM FILES ARE SUPPLIED ON THE LANG DESCRIPTION TAPE  
LANGDESC>>>>>

Some LANG supplied software:

To promote data from a tape use PROTAP.COM

To promote all data from the tape answer

'1ST DAY TO BE PROMOTED' with the yyddd of the tape label  
and 'LAST DAY TO BE PROMOTED' with the same yyddd+99  
(i.e. 82000 and 82099 for tape I82000 and even  
82300 and 82399 for tape I82300)

To promote less than the entire tape answer

'1ST DAY...' and 'LAST DAY...' as per required data  
(i.e. 82342 and 82345 for days 82342-82345)

Once online, to read inflight data into a formatted file

use EXAMLANG.EXE which uses subroutines from

LANGSUBROUTINES.OBJ (INFL\_READ,INFL\_CONVERT,INF\_VGET,FNE,FNI,FNENI)

EXAMLANG is the driver which, interactively, gathers the  
request parameters (date, start time,...) and  
formats the output (to file or screen).

INFL\_READ opens the appropriate data file, reads the packed  
integer data, and places the unpacked (real & integer)  
data in an array for the calling program (i.e. EXAMLANG)

INFL\_CONVERT unpacks the integer data and applies INF\_VGET

INFL\_VGET transforms the integer data (as stored in TM) into  
the real and integer temperatures, densities, etc.  
that it represents using the functions FNE and FNI  
for Ne and Ni calculations

Thus programs needed are:

PROTAP.COM and

EXAMLANG.EXE or EXAMLANG.FOR, and LANGSUBROUTINES.FOR  
to be compiled and linked appropriately.

Once linked EXAMLANG.EXE looks for the I-file(s) in SYS\$MAF  
and tries to write out any saved data file in SYS\$PROC  
therefore the two following assignments need to be made  
prior to running EXAMLANG or using PROTAP.COM

```
ASSIGN <your I-file destination directory> SYS$MAF
ASSIGN <saved data destination directory> SYS$PROC
```

Now you are ready to run.

\*\*\*\*\*

The data files themselves:

File names are of the form Iyyddd where yy is 81, 82, or 83 and  
0<ddd<366. The date range is 81215-83049 with almost all days  
represented.

Files are indexed organization using time in milliseconds as the  
key. A typical OPEN statement is

```
OPEN(UNIT=1,NAME='disk:[directory]Iyyddd.DAT',TYPE='OLD',
      ACCESS='KEYED',KEY=(1:4:INTEGER),RECL=35,READONLY,
      FORM='UNFORMATTED',ORGANIZATION='INDEXED',ERR=label1)
```

File records are 35 (4-byte) words in length (note RECL above)  
and cover 8 seconds (16 half-sec. samples) of data. The first  
word is overhead for the keyed-indexed organization. The second  
word is universal time in msec. of the first half-second of data  
in the record. The remaining 33 words are the data, in a packed  
integer form, covering 16 half-second-resolution samples that  
begin at that UT (call them DATA(1)-DATA(33)). Thus a typical  
initial (keyed) READ statement is  
READ(1,KEYGE=SOME\_UT,ERR=label2)ITIME,(IDATA(J),J=1,33)

This will read the first record with ITIME>=SOME\_UT (both times being in msec). Subsequent READ statements can read sequentially by removing the phrase KEYGE=SOME\_UT, possibly adding END=label3. The 3rd through 35th words of the record comprise the data. The 3rd word (IDATA(1) above) is satellite specific data (IMODE(1-2), IDED, IBIAS, ICMD, IANA, and ION) packed as follows  
 $((((IMODE(1)*4+IMODE(2))*4+IDEDED)*4+IBIAS)*2+ICMD)*4+IANA)*2+ION$   
As implied, these seven data are 1 or 2 bit fields.

IMODE(1:2) 2 bits, mode of each of the two probes

- = 0 adapt
- = 1 step
- = 2 ion hold
- = 3 electron hold

IDEDED 2 bits, which probe is dedicated

IBIAS 2 bits, indicates the extra bias potential applied to the sweep is not used (SHOULD BE!!!!!!)

ICMD 1 bit, command not used

IANA 2 bits, which probe is analog

ION 1 bit, probe on?

The 4th through 35th words of the record are paired up (i.e. IDATA(2) and IDATA(3), IDATA(4) and IDATA(5), ..., IDATA(32) and IDATA(33)) so that the 16 pairs cover the 16 half-seconds of data in the 8-second interval. These pairs are packed as follows

IDATA(2i)=((DV(1)\*1024)+DV(2))\*1024+NI(1)  
+1 {if NI(1) is negative}  
+1024 {if DV(2) is negative}  
+1024\*\*2 {if DV(1) is negative}

where i=1,2,3,...,16

IDATA(2i+1)=((NI(2)\*256)+IV)\*1024+NV  
+1 {if NV=max(NE(1),NE(2)) is negative}  
+1024 {if IV=max(V(1),V(2)) is negative}  
+1024\*256 {if NI(2) is negative}

where i=1,2,3,...,16

These are 8 or 10 bit data fields

V(1:2) 8 bits, VA start of sweep potential

DV(1:2) 10 bits, VA slope for this sweep, Te of last sweep

NI(1:2) 10 bits, Current detector range used in this sweep, 2 bits for decade range, 8 bits for vernier range

NE(1:2) 10 bits, decade range (2 bits) and curve amplitude (8 bits) giving electron current

The aforementioned subroutines INFL\_CONVER and INF\_VGET are THE algorithms for, respectively, the unpacking and translation of this array (DATA) of packed integers.

CCSDXKNM0002EMRK0003CCSDXKNM0002SMRK0005

LOG\_VOL\_TIME\_COVERAGE: YYYY-MM-DD TO YYYY-MM-DD

NAMING\_CONVENTION:

File names are of the form Iyyddd where yy is 81, 82, or 83 and 0<ddd<366. The date range is 81215-83049 with almost all days represented.

FILE\_TIME\_COVERAGE:

The times of the data segments in the I-files are contained in ILANG.CAT, while the list of the I-files is in LANGTAPELIST.DAT.

These two files are on the LANG description tape LANGDESC.

PREV\_LOG\_VOL\_COVERAGE: NONE

CCSDXKNM0002EMRK0005CCSDXRNM0003SMRK0006

NESTING= L

REF= FORMAT.SFD

CCSDXRNM0003EMRK0006CCSDXRLM0003SMRK0007

ADI= NSSD0005

CLASS= I

NESTING= N

SCOPE= EACH

REF=N\*.\*

CCSDXRLM0003EMRK0007CCSDXZLM0001EMARK001

Printed by user POSEY at 1-MAR-1990 12:21:41  
 File: \_DUB1:[SYSUSER1.][POSEY.TEMP]TAPEDESC.V/NG;11

### This is the LANG tape description file, TAPEDESC.LANG

This tape, the LANG DESCRIPTION TAPE — labeled LANG —, is being supplied to the NSSDC well in advance of the delivery of the data tapes. In addition to containing all LANG software, catalogs, FORTRAN source files and com files, this description tape is documented (contains documentation) to insure that the various programs will be compiled and linked appropriately to produce the required geophysical data.

This tape contains the following files:  
 (size listed is approximate size on VAX disk in blocks)

Catalog files:	ILANG.CAT;2	261
COM files:	PROTAP.COM;14	4
Data files:	BADLANG.DAT;1	2
	LANGTAPELIST.DAT;1	98
	SPINNERSLANG.DAT;1	17
FORTRAN source files:	LANGSUBROUTINES.FOR;7	23
	EXAMLANG.FOR;7	6
Documentation file:	TAPEDESC.LANG;10	10
NSSDC SFD files:	FORMAT.SFD;2	9
	VOLDESC.SFD;12	38

Total of 10 files, 468 blocks.

\*\*\*\*\*

### DESCRIPTION\_OF\_CATALOG\_FILES

The catalog file ILANG.CAT contains a list of the date and the start and stop times in milliseconds of all TM segments that have been processed into LANG I-files. This catalog can be searched using the VAX editor EDT to find whether a given date has data and if it has data, what are the start and stop times of the data.

### DESCRIPTION\_OF\_COM\_FILES

The only com file is PROTAP.COM which is used only to promote the data.

To promote data from a tape use PROTAP.COM

- (1) To promote all data from the tape answer  
 '1ST DAY TO BE PROMOTED' with the yyddd of the tape label  
 and 'LAST DAY TO BE PROMOTED' with the same yyddd+99  
 (i.e. 82000 and 82099 for tape I82000 and even  
 82300 and 82399 for tape I82300)

- (2) To promote less than the entire tape answer  
 '1ST DAY...' and 'LAST DAY...' as per required data  
 (i.e. 82322 and 82345 for days 82322-82345)

Once the data is online, use EXAMLANG.EXE to read inflight data into a formatted file or modify EXAMLANG.FOR for your particular needs.

### DESCRIPTION\_OF\_DATA\_FILES

The data file BADLANG.DAT contains a list of dates and start and stop times in HHMMSS format (hour minute second) when the summary plots showed some problem with the LANG data. The data is considered unusable during these times. The cause is unknown, but may be due to anomalous operation of the instrument or an anomaly in the data transmission. These times were used to delete bad data from the unified abstract database. There may not be data segments in ILANG.CAT corresponding to these times; when such data segments exist, do not process those times.

The data file SPINNERSLANG.DAT contains a list of dates and start and stop times in HHMMSS format when the spacecraft was spinning. This data is good for diagnostic purposes by the LANG group only and should therefore be considered in the same category as the data in BADLANG.DAT. Do not use data for the times listed in SPINNERSLANG.DAT.

### DESCRIPTION\_OF\_FORTRAN\_SOURCE\_FILES

EXAMLANG is the driver which interactively opens and reads the I-files, and then writes the LANG parameters: Te Np (plasma density) and Vs (satellite potential) to a file or to the screen. This file is a prototype for the user's own program for processing the data; it demonstrates how to call the subroutines and functions contained in LANGSUBROUTINES.FOR. EXAMLANG prompts for the date and start and stop time (in seconds) for the data which is written in formatted output to a file of the user's choice or to unit 6, the user's terminal. EXAMLANG.FOR calls the subroutine INFL\_READ and the function FNENI.

The subroutines contained in LANGSUBROUTINES.FOR are: INFL\_READ, INFL\_CONVERT, and INFL\_VGET. INFL\_READ opens the appropriate data file (I-file with name IYYDDD.dat, where YYDDD is the date) and reads the packed integer data, and places the unpacked (real & integer) data in an array for the calling program (i.e. EXAMLANG). INFL\_CONVERT unpacks the integer data and applies INFL\_VGET to transform the integer data (as stored in TM) into the geophysical parameters of temperature, density, and satellite potential. The functions FNE and FNI evaluate Ne and Ni from the calculated current and potential.

#### SUMMARY\_OF\_HOW\_TO\_USE\_PROGRAMS

The programs needed are: (1) PROTAP.COM and (2) EXAMLANG.EXE or EXAMLANG.FOR, and LANGSUBROUTINES.FOR (to be compiled and linked appropriately). Once linked EXAMLANG.EXE looks for the I-file(s) in SYS\$MAF and tries to write out any saved data file in SYS\$PROC therefore the two following assignments need to be made prior to running EXAMLANG or using PROTAP.COM.

ASSIGN <your I-file destination directory> SYS\$MAF

ASSIGN <saved data destination directory> SYS\$PROC

Now you are ready to run. Good luck.

From: DEIO::POSEY 27-FEB-1990 11:49:57.48  
To: DE614::HOEGY  
Cc:  
Subj: AS PROMISED MOMENTS AGO

This is the LANG tape description file, TAPEDESC.LANG

This tape, the LANG DESCRIPTION TAPE — labeled LANG —, is being supplied to the NSSDC well in advance of the delivery of the data tapes. In addition to containing all LANG software, catalogs, FORTRAN source files and com files, this description tape is documented (contains documentation) to insure that the various programs will be compiled and linked appropriately to produce the required geophysical data.

This tape contains the following files:  
(size listed is approximate size on VAX disk in blocks)

Catalog files:

ILANG.CAT;2 261

COM files:

PROTAP.COM;14 4

Data files:

BADLANG.DAT;1 2

LANGTAPELIST.DAT;1 98

SPINNERSLANG.DAT;1 17

FORTRAN source files:

LANGSUBROUTINES.FOR;7 23

EXAMLANG.FOR;7 6

Documentation file:

TAPEDESC.LANG;10 10

NSSDC SFD files:

FORMAT.SFD;2 9

VOLDESC.SFD;12 38

Total of 10 files, 468 blocks.

\*\*\*\*\*

DESCRIPTION\_OF\_CATALOG\_FILES

The catalog file ILANG.CAT contains a list of the date and the start and stop times in milliseconds of all TM segments that have been processed into LANG I-files. This catalog can be searched using the VAX editor EDT to find whether a given date has data and if it has data, what are the start and stop times of the data.

DESCRIPTION\_OF\_COM\_FILES

The only com file is PROTAP.COM which is used only to promote the data.

To promote data from a tape use PROTAP.COM

(1) To promote all data from the tape answer

'1ST DAY TO BE PROMOTED' with the yyddd of the tape label and 'LAST DAY TO BE PROMOTED' with the same yyddd+99

(i.e. 82000 and 82099 for tape I82000 and even  
82300 and 82399 for tape I82300)

(2) To promote less than the entire tape answer

'1ST DAY...' and 'LAST DAY...' as per required data

(i.e. 82322 and 82345 for days 82322-82345)

Once the data is online, use EXAMLANG.EXE to read inflight data into a formatted file or modify EXAMLANG.FOR for your particular needs.

DESCRIPTION\_OF\_DATA\_FILES

The data file BADLANG.DAT contains a list of dates and start and stop times in HHMMSS format (hour minute second) when the summary plots showed some problem with the LANG data. The data is considered unusable during these times. The cause is unknown, but may be due to anomalous operation of the instrument or an anomaly in the data transmission. These times were used to delete bad data from the unified abstract database. There may not be data segments in ILANG.CAT corresponding to these times; when such data segments exist, do not process those times.

The data file SPINNERSLANG.DAT contains a list of dates and start

and stop times in HHMMSS format when the spacecraft was spinning. This data is good for diagnostic purposes by the LANG group only and should therefore be considered in the same category as the data in BADLANG.DAT. Do not use data for the times listed in SPINNERSLANG.DAT.

#### DESCRIPTION\_OF\_FORTRAN\_SOURCE\_FILES

EXAMLANG is the driver which interactively opens and reads the I-files, and then writes the LANG parameters: Te Np (plasma density) and Vs (satellite potential) to a file or to the screen. This file is a prototype for the user's own program for processing the data; it demonstrates how to call the subroutines and functions contained in LANGSUBROUTINES.FOR. EXAMLANG prompts for the date and start and stop time (in seconds) for the data which is written in formatted output to a file of the user's choice or to unit 6, the user's terminal. EXAMLANG.FOR calls the subroutine INFL\_READ and the function FNENI.

The subroutines contained in LANGSUBROUTINES.FOR are: INFL\_READ, INFL\_CONVERT, and INFL\_VGET. INFL\_READ opens the appropriate data file (I-file with name IYYDDD.dat, where YYDDD is the date) and reads the packed integer data, and places the unpacked (real & integer) data in an array for the calling program (i.e. EXAMLANG). INFL\_CONVERT unpacks the integer data and applies INFL\_VGET to transform the integer data (as stored in TM) into the geophysical parameters of temperature, density, and satellite potential. The functions FNE and FNI evaluate Ne and Ni from the calculated current and potential.

#### SUMMARY\_OF\_HOW\_TO\_USE\_PROGRAMS

The programs needed are: (1) PROTAP.COM and (2) EXAMLANG.EXE or EXAMLANG.FOR, and LANGSUBROUTINES.FOR (to be compiled and linked appropriately). Once linked EXAMLANG.EXE looks for the I-file(s) in SYS\$MAF and tries to write out any saved data file in SYS\$PROC therefore the two following assignments need to be made prior to running EXAMLANG or using PROTAP.COM.

ASSIGN <your I-file destination directory> SYS\$MAF

ASSIGN <saved data destination directory> SYS\$PROC

Now you are ready to run. Good luck.

81302 121700 134700  
81321 063900 081700  
J1322 095800 102800  
81324 023900 031400  
81325 220400 238200  
81327 101400 112300  
81328 044600 053500  
81351 050700 070800  
82174 121000 122000  
82174 152000 153000  
82176 053330 053700  
82176 173000 173200  
82180 025700 033545  
82183 191500 194000  
82183 221000 221700  
82184 063000 065000  
82185 083500 084500  
82186 012000 013000  
82186 184400 185400  
82187 065545 072100  
82188 182530 183100  
82217 131000 131900  
82274 011800 013200  
82274 085300 090100  
82275 130930 132400  
82275 160200 161900  
82275 191900 193300  
82277 235600 240000  
82278 000000 004200  
82279 110700 112500  
82279 141700 144400  
82282 180900 182020  
82283 140000 141200  
82283 232000 234930

```
$ ON CONTROL_Y THEN GOTO END_PROTAP
$ SET NOON
$ SH DEV MS:
$ INQUIRE MTYP "Which tape drive would you like to use?"
$ ALLOCATE 'MTYP'
$ MNT = "NO"
$ IF .NOT.$STATUS THEN EXIT
$
$ L0:
$   IF MNT .EQS. "YES" THEN $ DISMOUNT/NOUNLOAD 'MTYP'
$   ON CONTROL_Y THEN GOTO END_PROTAP
$   INQUIRE FILE_1 "* Enter the first day to be promoted."
$   INQUIRE FILE_2 "* Enter the last day to be promoted."
$   ON CONTROL_Y THEN GOTO L0
$   IF FILE_1 .GT. FILE_2 THEN GOTO L0
$   TAPE_NUM = (FILE_1/100)*100
$
$ L1:
$
$   FILES = "NADA.DAT"
$   TAPE = "I",TAPE_NUM
$   INQUIRE RET "Please mount tape ''TAPE'' on ''MTYP'' and hit return."
$   MOUNT/FOREIGN/NOWRITE 'MTYP' 'TAPE'
$   MNT = "YES"
$   IF FILE_1 .EQ. TAPE_NUM THEN GOTO L4
$   IF FILE_1 .EQ. ((FILE_1/10)*10) THEN GOTO L3
$
$ L2:
$
$   FILES = FILES + ",I" + F$STRING(FILE_1) + ".DAT"
$   FILE_1 = FILE_1 + 1
$   IF FILE_1 .EQ. ((FILE_1/10)*10) THEN GOTO L3
$   IF FILE_1 .LE. FILE_2 THEN GOTO L2
$   BACKUP/REWI/LOG/INTERCHANGE 'MTYP''TAPE'./SELECT=('FILES') -
    [POSEY.DEBASE]*.* /OWNER=DE_USER
$   GOTO L0
$
$ L3:
$
$   IF (FILE_2-FILE_1) .LE. 10 THEN GOTO L2
$   FILES = FILES + ",I" + F$STRING(FILE_1/10) + "% DAT"
$   FILE_1 = FILE_1 + 10
$   IF FILE_1 .LE. FILE_2 THEN GOTO L3
$
! Be certain to assign SYS$MAF to your destination directory
$   BACKUP/REWI/LOG/INTERCHANGE 'MTYP''TAPE'./SELECT=('FILES') -
    SYS$MAF:.* /OWNER=DE_USER
$   GOTO L0
$
$ L4:
$
$   IF FILE_2 .GT. (FILE_1+97) THEN - !promote the whole tape
$     FILES = FILES + ",I" + F$STRING(FILE_1/100) + "% DAT"
$   IF FILE_2 .LT. (FILE_1+98) THEN GOTO L3
$
! Be certain to assign SYS$MAF to your destination directory
$   BACKUP/REWI/LOG 'MTYP''TAPE'./SELECT=('FILES') SYS$MAF:.*.
$   DISMOUNT 'MTYP'
$   MNT = "NO"
$   GOTO L0
$
$ END_PROTAP:
```

Printed by user POSEY at 1-MAR-1990 12:21:09  
File: \_DUB1:[SYSUSER1.][POSEY TEMP]SPINNERSLANG.DAT;1

81215 104913 110005  
81215 110005 111429  
81216 031005 034949  
81216 140109 145005  
81217 132437 134749  
81217 180845 183509  
81217 183517 195605  
81218 031205 032413  
81218 032421 034237  
81218 063957 071253  
81218 161933 162629  
81218 203533 204741  
81219 141837 155909  
81219 155917 172725  
81219 202349 212925  
81220 115301 115621  
81221 111301 111525  
81221 124733 125325  
81221 185317 194429  
81221 220909 225029  
81221 230053 230221  
81222 001141 003405  
81222 013933 015733  
81222 015741 022133  
81222 031709 032429  
81222 032445 034941  
81222 124749 134109  
81222 134117 152957  
81222 182941 191557  
81222 191605 192221  
81223 053149 055429  
81223 070933 071309  
81223 071350 074142  
81223 084726 090950  
81223 130525 132029  
81223 132053 144141  
81223 144157 162158  
81223 162213 164133  
81223 181213 183702  
81223 183717 194933  
81223 194933 210502  
81223 210510 215950  
81223 215958 225510  
81223 234710 234838  
81224 132134 145934  
81224 150038 155542  
81224 200838 201902  
81225 134910 141358  
81225 152822 165806  
81225 165854 171046  
81225 171054 185342  
81226 082518 085830  
81226 204014 205558  
81226 205606 222350  
81227 085158 092550  
81227 120758 121310  
81227 141334 141806  
81228 010246 014238  
81228 072814 082942  
81228 175534 182150  
81230 094726 110102  
81230 220822 221102  
81230 222854 223350  
81231 184158 191734  
81231 192718 201022  
81232 170710 181214

81233 231726 232838  
81234 163734 170334  
81243 061407 073359  
81243 073407 083759  
81243 083807 101359  
81243 101407 110631  
81243 131407 141359  
81243 141407 143215  
81243 143223 151759  
81243 151807 152551  
81243 152551 160559  
81243 160607 165311  
81243 165423 172551  
81243 172559 181359  
81243 181359 183903  
81243 184415 191223  
81243 191239 204127  
81243 204135 214855  
81243 214911 221359  
81243 221407 233031  
81243 233303 235959  
81244 000000 003247  
81244 003255 014143  
81244 014151 021359  
81244 021407 024111  
81244 024119 033319  
81244 033327 041247  
81244 041407 052239  
81244 172551 175511  
81244 175519 185943  
81244 185951 192431  
81245 134511 143759  
81245 143807 144711  
81245 144815 160647  
81254 100711 104823  
81254 104831 120047  
81260 142136 142344  
81260 203736 210232  
81260 210344 214352  
81260 214400 223208  
81269 141241 153337  
81269 153345 160601  
81276 114922 123818  
81276 123833 131817  
81276 131825 134257  
81279 120226 121522  
81282 101610 104802  
81305 061622 072846  
81305 072854 085702  
81316 164551 170023  
81316 212231 213559  
81319 020928 030616  
81319 030624 035416  
81321 000000 000848  
81321 075408 081848  
81322 225704 233704  
81322 234320 235959  
81324 112152 121736  
81325 154657 161945  
81325 190033 193313  
81325 220409 230153  
81326 204657 212545  
81341 060531 063427  
81341 063435 075451  
81342 062659 065643  
81342 065652 081644

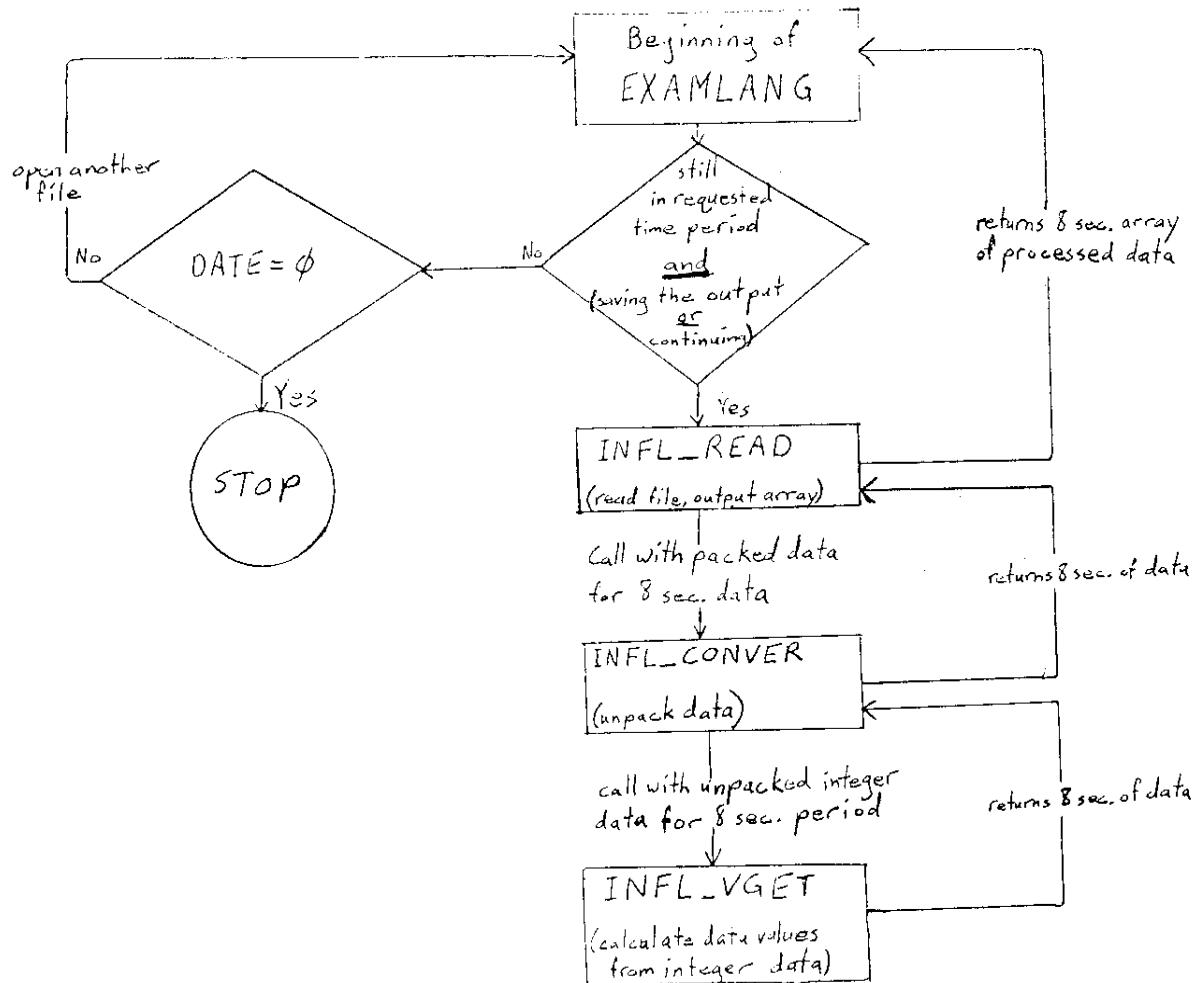
81349 205957 210221  
81358 082838 084846  
81358 085510 085702  
81358 085702 092126  
81358 092134 100926  
81362 085230 091302  
81362 091310 093014  
81362 093022 095254  
81362 095302 095838  
81362 100406 102606  
81362 223454 232846  
82004 000000 000823  
82006 144240 154512  
82006 154520 162520  
82013 151913 155801  
82013 155809 170209  
82014 000537 002000  
82019 084305 092250  
82020 140122 144634  
82020 144642 154226  
82021 084914 091010  
82021 091018 095034  
82029 133347 133843  
82033 080939 083651  
82034 051355 055115  
82034 055131 065555  
82037 125852 133724  
82041 115004 122700  
82041 122717 133108  
82043 172037 182005  
82043 182013 190037  
82046 014237 022405  
82052 171437 180349  
82052 180358 185214  
82053 121318 123902  
82054 041038 041046  
82056 054702 060030  
82056 060038 070214  
82057 071622 073622  
82057 073630 084910  
82063 184335 184415  
82068 175559 182727  
82071 105712 114952  
82071 215351 231055  
82074 195808 195816  
82075 091736 101224  
82078 133336 140328  
82080 224440 231840  
82081 092216 094616  
82081 094624 110432  
82084 224321 233817  
82087 072857 080257  
82093 070506 070618  
82096 084139 094539  
82096 094547 102531  
82099 223843 231235  
82100 045803 052803  
82107 142908 150300  
82112 112637 113149  
82113 130021 133213  
82113 133229 144421  
82114 155453 162845  
82121 054926 061918  
82126 161446 171102  
82126 171110 175846  
82128 022846 025846

82129 102751 110143  
82135 193743 200735  
82137 063711 071111  
82143 172616 175608  
82144 012552 015856  
82146 025856 033000  
82146 033016 040224  
82146 040240 045840  
82146 045856 053056  
82150 115441 120649  
82150 121353 121537  
82150 121649 122353  
82150 201137 204129  
82152 003521 010913  
82153 013337 013409  
82156 155114 165450  
82156 165458 173506  
82157 021914 024914  
82161 172034 172042  
82165 012450 012658  
82165 012658 015442  
82165 024331 031723  
82167 154210 163842  
82171 013739 020147  
82171 020155 024939  
82171 024947 032131  
82173 140659 144051  
82174 035532 042532  
82185 001124 001228  
82185 171756 173940  
82185 221340 224716  
82186 012228 015612  
82187 011732 012916  
82187 012924 020932  
82193 205029 205533  
82200 095318 102645  
82201 031438 034430  
82212 090415 093743  
82212 170751 173743  
82214 220719 222951  
82214 222951 232552  
82219 133616 140944  
82219 215512 220632  
82219 220640 222456  
82223 180113 180209  
82227 162857 165129  
82227 165137 165857  
82229 005401 012729  
82229 041209 041705  
82229 231305 235959  
82230 000000 001705  
82234 161138 164058  
82240 094426 105826  
82244 034323 042043  
82244 042043 050011  
82244 050019 054747  
82246 013411 015219  
82246 015243 020323  
82246 131803 134803  
82248 051259 051307  
82250 233811 233843  
82250 234043 234147  
82250 234619 234659  
82250 234811 234907  
82258 124020 125212  
82258 192116 195004

82259 024916 033204  
82259 031956 033204  
82259 033212 034716  
82259 175004 175316  
82259 175316 185724  
82260 030700 031756  
82260 031805 034037  
82262 105236 112236  
82263 104157 111141  
82267 014405 014517  
82267 205053 212029  
82272 190302 193246  
82274 113926 114230  
82279 052639 052807  
82279 223439 223551  
82280 144911 145223  
82283 103727 111103  
82285 093256 101336  
82285 101344 105328  
82286 035424 043016  
82287 140520 140552  
82288 053816 061152  
82290 085248 092848  
82294 224857 225001  
82294 232841 232849  
82297 205754 212722  
82300 165050 165626  
82300 165634 180850  
82303 100714 101530  
82303 101538 104026  
82305 024147 031123  
82306 052235 055347  
82306 054339 055347  
82309 041331 044339  
82309 235851 235959  
82310 000000 002115  
82310 002123 003003  
82315 060132 062036  
82315 204317 205405  
82316 202813 203045  
82318 124621 125053  
82320 110805 114005  
82320 200846 201302  
82322 010526 010710  
82323 144206 144214  
82323 204158 205014  
82323 215102 215518  
82325 135358 135806  
82326 013630 023710  
82326 023718 031414  
82327 000000 000207  
82327 133055 140431  
82330 110831 111335  
82332 025511 032727  
82335 131328 134312  
82336 082616 085952  
82343 024442 031426  
82344 025250 025338  
82354 223635 224907  
82354 224907 231011  
82357 070748 071116  
82359 002516 002828  
82361 091244 094228  
82362 052740 054444  
82364 122405 124021  
82364 124029 133229

82364 133237 140149  
83001 235333 235845  
83001 235853 235959  
83002 000000 002341  
83002 045734 052918  
83004 121614 122158  
83004 122206 124550  
83008 234246 235959  
83009 000000 001222  
83009 185951 190135  
83012 071151 074855  
83013 030407 031215  
83013 031223 033351  
83016 002735 011055  
83018 011103 014303  
83018 145752 152336  
83018 152352 152728  
83021 004648 012256  
83021 012304 020720  
83024 030345 033321  
83025 204817 211753  
83031 001618 004026  
83031 004034 011706  
83031 221626 221954  
83032 110426 110842  
83032 110850 113018  
83032 145506 145738  
83034 040322 040802  
83034 183202 183522  
83037 160915 161115  
83040 233147 235115  
83040 235115 235459  
83042 153411 160347  
83043 103147 103339  
83043 112059 112307  
83045 134212 134740  
83045 134748 141156  
83045 195212 195332  
83045 195340 200308  
83045 200308 204708  
83047 142156 143708  
83047 154228 160540  
83047 170916 172332  
83047 172332 175004  
83047 175004 181748  
83047 232052 234116  
83048 024148 030500  
83048 050452 052012  
83048 104100 105148  
83048 105156 113204  
83048 152228 154540  
83048 164908 171724  
83048 185844 191100  
83048 191100 195452  
83049 003644 003748  
83049 003748 011956  
83049 012004 012828  
83049 042700 042948  
83049 043100 045508  
83049 045516 045644  
83049 122404 130652  
83049 130652 131548  
83049 162652 164436

Once online, to read inflight data into a formatted file  
use EXAMLANG.EXE which uses subroutines from  
LANGSUBROUTINES.OBJ (INFL\_READ, INFL\_CONVERT, INF\_VGET, FNE, FNI, FNENI)  
EXAMLANG is the driver which, interactively, gathers the  
request parameters (date, start time,...) and  
formats the output (to file or screen).  
INFL\_READ opens the appropriate data file, reads the packed  
integer data, and places the unpacked (real & integer)  
data in an array for the calling program (i.e. EXAMLANG)  
INFL\_CONVERT unpacks the integer data and applies INF\_VGET  
INFL\_VGET transforms the integer data (as stored in TM) into  
the real and integer temperatures, densities, etc.  
that it represents using the functions FNE and FNI  
for Ne and Ni calculations



```
PROGRAM EXAMLANG
CHARACTER CONT*1,BUF*80,OUT*1,OUT_FILE*45
REAL*4 DATA(16,6), NP
INTEGER*4 MAP(7)
DATA      MAP/6, 1, 2, 3, 4, 5, 6/
DATA      IPROBE/2/
COMMON/ERRCOM$/BUF
1 CLOSE(UNIT=7)
WRITE(6,100)
READ(5,*,END=1000,ERR=1)IDATE
IF(IDATE.LE.0) GOTO 1000
WRITE(6,101)
READ(5,*,END=1000,ERR=1)ITIME
ITIME = ITIME * 1000
WRITE(6,102)
READ(5,*,END=1000,ERR=1)IDEND
WRITE(6,103)
READ(5,*,END=1000,ERR=1)ITEND
ITEND = ITEND * 1000
WRITE(6,110)
READ(5,'(A1)',END=1000,ERR=1)OUT
IF(OUT .EQ. 'Y' .OR. OUT .EQ. 'y') THEN
  IDIT = (IDATE - 80000)*1.E5 + ITIME*.001
  WRITE(OUT_FILE,'(9HSYS$PROC:,I9,3H.P2)') IDIT
  WRITE(6,109)IDIT
  OPEN(UNIT=7,STATUS='NEW',NAME=OUT_FILE)
  IUNIT = 7
ELSE
  IUNIT = 6
ENDIF
IF(IDATE .GT. IDEND) IDEND=IDATE
IF(IUNIT .EQ. 6) WRITE(6,107)
10 CALL INFL_READ(IDATE,ITIME,MAP,KEYRD,DATA,IERR)
DO J=1,16
  IP = IFIX(DATA(J,2))
  NP = FNENI(DATA(J,4),DATA(J,5))
  IF(NP .LT. 1.E-2) NP=0.
  IF(DATA(J,5) .LT. 2.E4) DATA(J,3)=0.
  IF(IP .EQ. IPROBE .OR. IPROBE .EQ. 0) THEN
    WRITE(IUNIT,105)IDATE,ifix(DATA(J,1)),DATA(J,3),
  &           NP,DATA(J,6),IP
  ENDIF
ENDDO
ITIME=ITIME+10
IF(IDATE .GT. IDEND .OR. IERR .NE. 0) GOTO 1
IF(IDATE .GE. IDEND .AND. ITIME .GE. ITEND+1) GOTO 1
```

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File: \_DUB1:[SYSUSER1.][POSEY TEMP]EXAMLANG.FOR;7

```
IF(IUNIT .EQ. 6) THEN
  WRITE(6,106)
  READ(5,'(A1)',END=1,ERR=1)CONT
  IF(CONT .EQ. 'N' .OR. CONT .EQ. 'n') GOTO 1
  WRITE(6,107)
ENDIF

GOTO 10

1000 CLOSE(UNIT=7)

100 FORMAT(1X,'* Enter the start date(YYDDD), (type 0 to stop): ',,$)
101 FORMAT(1X,'* Enter the start time (SECS): ',,$)
102 FORMAT(1X,'* Enter the stop date (YYDDD): ',,$)
103 FORMAT(1X,'* Enter the stop time (SECS): ',,$)
104 FORMAT(1X,'*** No data available within the given window ***')
105 FORMAT(1X,I5,5X,I8,5X,F6.0,5X,1PE9.3,4X,0PF6.2,4X,I2)
106 FORMAT(1X,'** Do you wish to continue?(y/n): ',,$)
107 FORMAT(1X,'Date ',4X,' Time ',4X,' Temp. ',4X,
      &           ' Np ',4X,'Potential',2X,'Probe',
      &           '/,1X,'_____),',
      &           '_____)')
108 FORMAT(1X,'The data for orbit ',I5,' date',I5,' and times',
      &           2(I8,1X),'are currently offline.',/,/)
109 FORMAT(1X,'The name of your file is ',I9,'.P2')
110 FORMAT(1X,'* Would you like to save the output? (Y/N): ',,$)

STOP
END
```

This is the LANG format file

CCSDYDNM000200NSSD0005SMRK0001  
TYPE\_OF\_FILE\_NAME: LANG I-FILES

FILE\_ATTRIBUTES:

File records are 35 (4-byte) words in length (note, RECL = 35)  
and cover 8 seconds (16 half-sec. samples) of data. The first  
word is overhead for the keyed-indexed organization. The second  
word is universal time in msec. of the first half-second of data  
in the record. The remaining 33 words are the data, in a packed  
integer form, covering 16 half-second-resolution samples that  
begin at that UT (call them DATA(1)-DATA(33)). Thus a typical  
initial (keyed) READ statement is

```
READ(1,KEYGE=SOME_UT,ERR=label2)ITIME,(IDATA(J),J=1,33)
```

This will read the first record with ITIME>=SOME\_UT (both times  
being in msec). Subsequent READ statements can read sequentially  
by removing the phrase KEYGE=SOME\_UT, possibly adding END=label3.

The 3rd through 35th words of the record comprise the data. The  
3rd word (IDATA(1) above) is satellite specific data (IMODE(1-2),  
IDED, IBIAS, ICMD, IANA, and ION) packed as follows

```
((((IMODE(1)*4+IMODE(2))*4+IDED)*4+IBIAS)*2+ICMD)*4+IANA)*2+ION
```

As implied, these seven data are 1 or 2 bit fields.

IMODE(1:2) 2 bits, mode of each of the two probes

= 0 adapt

= 1 step

= 2 ion hold

= 3 electron hold

IDED 2 bits, which probe is dedicated

IBIAS 2 bits, indicates the extra bias potential applied  
to the sweep, negative, positive, none.

ICMD 1 bit, command, not used

IANA 2 bits, which probe is analog

ION 1 bit, probe on switch

The 4th through 35th words of the record are paired up (i.e.  
IDATA(2) and IDATA(3), IDATA(4) and IDATA(5), ..., IDATA(32)  
and IDATA(33)) so that the 16 pairs cover the 16 half-seconds  
of data in the 8-second interval. These pairs are packed as  
follows:

```
IDATA(2i)=((DV(1)*1024)+DV(2))*1024+NI(1)
    +1      {if NI(1) is negative}
    +1024   {if DV(2) is negative}
    +1024**2 {if DV(1) is negative}
where i=1,2,3,...,16
```

```
IDATA(2i+1)=((NI(2)*256)+IV)*1024+N
    +1      {if N=max(NE(1),NE(2)) is negative}
    +1024   {if IV=max(V(1),V(2)) is negative}
    +1024*256 {if NI(2) is negative}
where i=1,2,3,...,16
```

These are 8 or 10 bit data fields

V(1:2) 8 bits, VA start of sweep potential  
DV(1:2) 10 bits, VA slope for this sweep, Te of last sweep

NI(1:2) 10 bits, Current detector range used in this  
sweep, 2 bits for decade range, 8 bits  
for vernier range

NE(1:2) 10 bits, decade range (2 bits) and curve amplitude

(8 bits) giving electron current

The subroutines INFL\_CONVERT and INF\_VGET are sample algorithms for, respectively, the unpacking and translation of this array (DATA) of packed integers. This software is on the LANG description tape LANGDESC and is also available upon request from the LANG contact person Walter R. Hoegy over SPAN DEIO::HOEGY, DE614::HOEGY.

LOGICAL\_RECORD\_LENGTH: 35 bytes

TYPE\_OF\_FILE\_DESCRIPTION:

Files are indexed organization using time in milliseconds as the key. A typical OPEN statement is

```
OPEN(UNIT=1,NAME='disk:[directory]Iyyddd.DAT',TYPE='OLD',
      ACCESS='KEYED',KEY=(1:4:INTEGER),RECL=35,READONLY,
      FORM='UNFORMATTED',ORGANIZATION='INDEXED',ERR=label1)
```

File records are 35 (4-byte) words in length (note RECL above) and cover 8 seconds (16 half-sec. samples) of data. The first word is overhead for the keyed-indexed organization. The second word is universal time in msec. of the first half-second of data in the record. The remaining 33 words are the data, in a packed integer form, covering 16 half-second-resolution samples that begin at that UT (call them DATA(1)-DATA(33)).

FILE\_STRUCTURE:

I-files are written as VAX unformatted sequential ,keyed-indexed files.

FORMAT\_OF\_THE\_LOGICAL\_RECORD:

SEE FILE\_ATTRIBUTES:

FIELD\_RELATIONSHIPS:

SEE FILE\_ATTRIBUTES:

CCSDYDNM000200NSSD0005EMRK0001

```
*****
C File : LANGSUBROUTINES.FOR (LANG INFLIGHT Subroutines)
C Contains: Subroutines INFL_READ, INFL_CONVER, INFL_VGET
C           Functions FNE, FNI, FNENI
*****
SUBROUTINE INFL_READ(IDATE,ITIME0,MAP,KEYRD,DATA,IERR)

C This subroutine gets 16 data points
C ITIME0 is requested time on call, on return is time of next data in MSEC

INTEGER*4 INFL(33), MAP(*), IPVEC(16)
REAL*4 DATA(16,*), TNNV(4,16), LIMLO(4), LIMHI(4)
CHARACTER INPUT_FILE*45, BUF*80, ON_OFF*3
LOGICAL*1 EIGHTSEC

COMMON/ERRCOM$/BUF
COMMON/STATCOM$/IMODE(2), IDED, IBIAS, ICMD, IANA, ION
COMMON/NICEPLOT/NICEPLOT ! To not zero Te at low Ni

DATA      LIMLO/100., 100., 100., -4./
DATA      LIMHI/2.0E4, 1.E8, 1.E8, 4./
DATA      IDAOLD/0/
DATA      LASTIME/0/
DATA      EIGHTSEC/.FALSE./

ITIME=ITIME0
IF(IDATE.NE.IDAOLD)THEN

C Set Keyed read and Open new I* file, remember to assign SYS$MAF

      KEYRD = 1
      IDAOLD = IDATE
      WRITE(INPUT_FILE,'(9HSYS$MAF:I,I5,4H.DAT)')IDATE
      CLOSE(UNIT=98)
      OPEN(UNIT=98,NAME=INPUT_FILE,TYPE='OLD',ERR=30,READONLY,
      1          ACCESS='KEYED',KEY=(1:4:INTEGER),RECL=35,
      2          FORM='UNFORMATTED',ORGANIZATION='INDEXED')
      ENDIF

2 IF(KEYRD .GE. 1) THEN
      ITREAD=ITIME0-7500 ! should it be -7500 ??
      READ(98,KEYGT=ITREAD,ERR=60)ITIME,(INFL(K),K=1,33)
      KEYRD=0
      EIGHTSEC=.FALSE.

      ELSE
      READ(98,ERR=60,END=40)ITIME,(INFL(K),K=1,33) ! sequential read
      ENDIF

C Check for 8 second interval. LASTIME LE 0 means last read was first in
C I* file. EIGHTSEC=.TRUE. is key to do check.

      IF( LASTIME .GE. 0 .AND. EIGHTSEC .AND.
      & ITIME-LASTIME .LT. 7600 ) GOTO 2

      EIGHTSEC=.TRUE.
      LASTIME = ITIME

      CALL INFL_CONVER(IPVEC,INFL,TNNV)
```

C Check MODE

```
IF(IBIAS .EQ. 3) GOTO 70

IF( IMODE(2) .NE. 0 ) GOTO 2

INCREM=1
7 IND_DATA=0

DO 33 I33=1,16,INCREM
  IPROBE=IPVEC(I33)
  IND_DATA=IND_DATA+1
  ITIM33=ITIME+500*I33-8000

  DO IND_MAP = 1, MAP(1)
    NUM_MAP = MAP(IND_MAP + 1)
    IF(NUM_MAP .EQ. 1)DATA(IND_DATA,IND_MAP) = FLOAT(ITIM33)
    IF(NUM_MAP .EQ. 2)DATA(IND_DATA,IND_MAP) = FLOAT(IPROBE)

    IF(NUM_MAP .GE. 3 .AND. NUM_MAP .LE. 6)THEN
      NUM_MAP = NUM_MAP - 2
      IF(TNNV(NUM_MAP,I33) .LT. LIMLO(NUM_MAP) .OR.
        TNNV(NUM_MAP,I33) .GT. LIMHI(NUM_MAP))THEN
        DATA(IND_DATA,IND_MAP) = 0.
      ELSE
        DATA(IND_DATA,IND_MAP) = TNNV(NUM_MAP,I33)
      ENDIF
    ENDIF
  ENDDO
```

33 CONTINUE

```
IERR=0                      !Return error code of '0':
ITIME0=ITIME
BUF=% INFL- Operation has successfully completed'
RETURN
```

```
30 IERR=3                  !Return error code of '3':
BUF=% INFL- The relevant data is currently offline, promote.'
RETURN
```

```
40 IERR=4                  !Return error code of '4':
BUF=% INFL- Time requested is after last data segment of day.'
RETURN
```

```
60 IERR=6                  !Return error code of '6':
ITIME0=ITREAD
BUF=% INFL- Error reading INFLIGHT data file (Could be EOF?).'
RETURN
```

```
70 IERR=7                  !Return error code of '7':
BUF=% INFL- IBIAS equals 3 is bad data.'
RETURN
```

END

\*\*\*\*\*

SUBROUTINE INFL\_CONVERT(IPVEC,INFL,TNNV)

C This subroutine changed to return all 16 values of the 8 sec period.
C Change made 1-9-1985 WRH.

REAL\*4 TNNV(4,16)

```
INTEGER*4 INFL(33),IPVEC(16)

COMMON/GETCOM$/VION,VE,VP,DVDT,VEE,VIONW,
& DVDTW,CI,CE,IP,FLTE,RTE,NIFLT,NEFLT,IEVGET
COMMON/BITCOM$/IDATA(128,9),ANA(32),ADV(8,2),DV(2),
& V(2),NI(2),NE(2)
COMMON/STATCOM$/IMODE(2),IDED,IBIAS,ICMD,IANA,ION
COMMON/NICEPLOT/NICEPLOT ! To not zero Te at low Ni

DATA RLEVEL/99999./

DO 33 I33=1,16
  IC=I33

  IF(IC.EQ.1)THEN
    ION=MOD(INFL(1),2)
    IANA=MOD((INFL(1)/2),4)
    ICMD=MOD((INFL(1)/8),2)
    IBIAS=MOD((INFL(1)/16),4)
    IDED=MOD((INFL(1)/64),4)
    IMODE(2)=MOD((INFL(1)/256),4)
    IMODE(1)=INFL(1)/1024
  ENDIF

  I=2*IC
  DV(2)=MOD((INFL(I)/1024),1024)
  DV(1)=INFL(I)/1048576

  IF(INFL(I+1).LT.0)THEN
    IF(INFL(I+1) .LE. -2147483648)THEN
      IPVEC(IC)=-1
      GOTO 33
    ELSE
      IP=2
      INFL_IPLUS_1 = -INFL(I+1)
    ENDIF

    ELSE
      IP=1
      INFL_IPLUS_1=INFL(I+1) !This had not been assigned,messing 1
    ENDIF

    IPVEC(IC)=IP
    NI(1)=MOD(INFL(I),1024)
    NI(2)=INFL_IPLUS_1 /262144
    N=MOD(INFL_IPLUS_1 ,1024)
    IV=MOD((INFL_IPLUS_1 /1024),256)
    NE(IP)=N
    V(IP)=FLOAT(IV)

    NI(3-IP)=0
    NE(3-IP)=0
    V(3-IP)=0.

    CALL INFL_VGET

    TNNV(1,IC)=FLTE
    TNNV(2,IC)=FNE(CE,VEE+VP,RTE)*.6666667

    C Ion density is invalid when the gain of probe two is saturated.
    C 1023 is the saturation limit of electrometer two. 31 May 1985. WRH

    IF( IP.EQ.2 .AND. NI(2).LT.1022)
```

& TNNV(3,IC)=FNI(CI,VIONW+VP,.75)  
IF( IP.EQ.2 .AND. NI(2).GE.1022)TNNV(3,IC)=999.

C This added 6-5-85

```
IF( IP.EQ.2 .AND. NI(2).GE.990)THEN ! 990 IS ABOUT N=2.E4 ?
  IF (NICEPLOT.NE.1)TNNV(1,IC)=0 !change made 1-2-85, IF added 9-20-85
  IF(RTESAVE.LE.0)RTESAVE=RTE ! IF FIRST TIME
  TNNV(2,IC)=FNE(CE,VEE+VP,RTESAVE)*.6666667
ELSE
  IF(IP.EQ.2)RTESAVE=RTE
ENDIF
```

C Added 12-24-85 Interpolation function for Ni
C TNNV(3,IC)=FNENI( TNNV(2,IC),TNNV(3,IC) )
C IF(TNNV(3,IC) .LE. 0. ) TNNV(3,IC) = -999.

TNNV(4,IC)=VP

C under Larry Brace's instructions to not return Te when Ni
C from probe 2 is less than 2.e4 W.R.H.
C confirmed 6-5-85

33 CONTINUE

```
RETURN
END
```

\*\*\*\*\*

#### SUBROUTINE INFL\_VGET

C Subroutine changed 5-25-85 to allow simple use of probe 1 Te
C in calculation of probe 1 Ne. Purpose is to eliminate artificial
C structure from probe 2 Te at low densities (Ni<2.E4).

```
REAL*4 DIMUL(2),DEMUL(2),TECON(2),TEMUL(2),
& DINORM(2),FNECOF(3)

COMMON/GETCOM$/VION,VE,VP,DVDT,VEE,VIONW,
& DVDTW,CI,CE,IP,FLTE,RTE,NIFLT,NEFLT,IEVGET
COMMON/BITCOM$/IDATA(128,9),ANA(32),ADV(8,2),DV(2),
& V(2),NI(2),NE(2)
COMMON/STATCOM$/IMODE(2),IDED,IBIAS,ICMD,IANA,ION

DATA DIMUL,DEMUL,TECON,TEMUL/2.4E6,2.4E6,1.176E4,1.176E4
& ,-6802.87,-6802.87,22.995,22.995/
DATA DINORM/1.7,1.7/
DATA NFNE,FNECOF/3,-1.6639,1.0471,-8.7978E-2/

VION=10.134+.0559564*V(IP)
```

C IMODE=0 FOR ADAP,1 FOR STEP,2 NIHOLD,3 NEHOLD

```
IF(IMODE(IP) .EQ. 1) THEN
  DVDT=27.195
  IF(VION .GT. -4.5) DVDT=6.799
ELSE
  DVDT=-16.2462+.055133*D(V(IP))
ENDIF
```

VADD2=0.

VADD=0.

IF(IMODE(IP) .EQ. 0) VADD=2.

IF(IMODE(IP) .EQ. 1 .AND. VION .GT. -4.5) THEN

```
VADD=4.  
VADD2=5.  
ENDIF  
  
IF(IP .EQ. 2) THEN  
  VE=VION+DVDT*.43248  
ELSE  
  VION=VION-.039*DVT  
  VE=VION+.484375*DVT  
ENDIF  
  
DVDTW=DVDT/113.3  
VP=VION-DVDTW*43.027761  
VEE=VE+VADD  
VIONW=VION+VADD2  
CE=0.  
CI=0.  
NIFLT=0  
NEFLT=0  
  
IF(NI(IP) .GT. 0) THEN  
  NIFLT=1  
  IVNI=MOD(NI(IP),256)  
  IDNI=NI(IP)/256  
  SAVE=.988842977-.003553719*IVNI  
  CI=3.3*SAVE*10.**(IP-1-IDNI)  
ENDIF  
  
IF(NE(IP) .GT. 0) THEN  
  NEFLT=1  
  IVNE=MOD(NE(IP),256)  
  
  IF(IVNE .GE. 255) THEN  
    NEFLT=0  
    IDNE=0  
  ELSE  
    IDNE=NE(IP)/256  
    CE=SAVE*(-4.135+.0557*IVNE)*10.**(IP-1-IDNE)  
  ENDIF  
  
ENDIF  
  
FLTE=TECON(IP)+TEMUL(IP)*DV(IP)  
RTE=FLTE*.001  
  
RETURN  
END  
  
*****  
  
FUNCTION FNE(CE,V,RTE)  
  
C INVERSE OF ELCUR CONST 5.476E-6 IS 1.8262E5  
C CE=ACC EL CURRENT (MAMPS),V=ACTUAL PROBE TO PLASMA VOLTAGE,  
C RTE=ELECTRON TEMPERATURE (1000 DEG K)  
  
REAL*4 DIMUL(2),DEMUL(2),TECON(2),TEMUL(2),  
& DINORM(2),FNECOF(3)  
  
DATA CON/1.8262E5/  
DATA DIMUL,DEMUL,TECON,TEMUL/2.4E6,2.4E6,1.176E4,1.176E4  
& , -6802.87,-6802.87,22.995,22.995/  
DATA DINORM/1.7,1.7/  
DATA NFNE,FNECOF/3,-1.6639,1.0471,-8.7978E-2/  
VOLT=1.+11.605*V/RTE
```

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 File: \_DUB1:[SYSUSER1.][POSEY.TEMP]LANGSUBROUTINES.FOR;7

```

IF(VOLT .LE. 1 .OR. RTE .LE. 0.) THEN
  FNE=1.
  RETURN
ENDIF

X=SQRT(VOLT)
Y=1.
FNE=0.

DO 11 I=1,NFNE
  Y=Y*X
  FNE=FNE+Y*FNECOF(I)
11 ENDDO

FNE=CON*CE/(SQRT(RTE)*FNE)

RETURN
END
*****
```

FUNCTION FNI(CI,V,VEL)

C INVERSE OF ONCUR CONST 3.55E-7 IS 2.8169E6  
 C CI=ION CURRENT M-AMPS,V=ACUTAL PROBE TO PLASMA POT(VOLTS)(NEG)  
 C VEL NET PLASMA DRIFT NORMAL TO PROBE (10KM/SEC)

DATA CON/2.8169E6/

DUM=VEL\*VEL-.1206\*V

IF(DUM .LE. 0) THEN
 FNI=1.
 RETURN
ENDIF

FNI=CON\*CI/SQRT(DUM)

RETURN
END
\*\*\*\*\*

C Filename: SYS\$USR1:[LANGMUIR]FNENI.FOR

C

C function neni ( NE, NI )     Ne, Ni are electron, ion densities  
 C                                neni is the continuous returned density

C

C "Good" refers to greater than 1.e2 for the Ni and Ne values  
 C The transition region is from 1.e4 to 3.e4

C

C The weighted average is Fnemi = [ log(Ni) \* ( A - log(1.e4) ) +  
 C                                log(Ne) \* ( log(3.e4) - A ) ] /  
 C                                [ log(3.e4) - log(1.e4) ]

C

C                                where A = log(Ni)

C

C It is used for Ni in the transition region and Ne good, but not  
 C above the transition region. In other cases Ni, Ne, or 0. is  
 C returned as appropriate.

FUNCTION FNENI( NE, NI )

implicit none .

```
real*4 fneni, NE, NI, xhi, xlo, rdel, x0, x1, x2, xne, xni, y, d
c
          ln(3.e4)  ln(1.e4)  1./diff
data xhi, xlo, rdel / 4.47712, 4.0 , 2.0959 /
data x0, x1, x2 / 1.e2, 3.e4, 1.e4/
if( NI .ge. x1 ) then           ! Above transition
  fneni = NI
elseif( NI .le. x2 .and. NE .gt. x0 ) then   ! Below transition
  fneni = NE
elseif( NE .le. x0 ) then       ! NE bad and NI too low
  fneni = 0.
elseif( NE .gt. x1 ) then      ! NE greater than NI ??
  fneni = 0.
else
  xne = alog10(NE)
  xni = alog10(NI)
  y = xni
  d = ( y - xlo ) * rdel
  fneni = d * xni + (1.-d) * xne
  fneni = 10.**fneni
endif

return
end
```







FILE	RECORD	LENGTH	BYTES
1	69610	4101411	115C1010
2	7101	2659352	00000000
3	7141	82535402	00000000
4	7120	14650000	00000000
5	7161	00000000	00000000
6	7210	00000000	00000000
7	7241	95798719	00000000
8	7281	0124B3D1	96CEA5E5
9	7320	1056434	20DNE5LW
10	7360	00010000	00000000
11	7410	00000000	00000000
12	7440	514E73	00000000
13	7480	00010000	00000000
14	7520	00010000	00000000
15	7561	00000000	00000000
16	7601	00000000	00000000
17	7641	00000000	00000000
18	7681	00000000	00000000
19	7720	00000000	00000000
20	7760	EEA4AE55	96EC375
21	7810	81582CT7	00000000
22	7840	F34AC31	00000000
23	7881	00000000	00000000
24	7920	00000000	00000000
25	7961	00000000	00000000
26	8001	00000000	00000000
27	8140	00000000	00000000
28	8180	00000000	00000000
29	8120	00000000	00000000
30	8161	00000000	00000000
31			
32	FILE	2	8775 LENGTH 3192BYTES
33	4	00000004	0100020J1 48222113
34	811	00000000	00000000
35	8120	00000000	00000000
36	1201	00000000	00000000
37	1611	00000000	00000000
38	2001	00000000	00000000
39	2401	00000000	00000000
40	2801	BFD10011	00000000
41	3211	00000000	00000000
42	3611	00000000	00000000
43	4001	00000004	0F00B000
44	4401	000020A0	000020A0
45	4801	10000000	00000000
46	5201	00000000	00000000
47	5601	00000000	00000000
48	6001	6CC4FD10	18000051 74C4CD1W
49	6401	74B4DD00	10000051 50D4D7D5
50	6801	5164E84C	00000051 6C00D000
51	7211	00000000	00000000
52	7601	00000000	00000000
53	8001	00000000	00000000
54	8401	00000000	00000000
55	8801	9327C81	9C0B8700 10000050
56	9201	00000000	00000000
57	9601	00000000	00000000
58	1000	00000000	00000000
59	1040	00000000	00000000
60	1080	00000000	00000000
61	1120	00000000	00000000
62	1160	00000000	00000000





1	( 664 )	0 064505	5 B5E15F4	1 184457	5 E6B15F4	1 694055
2	( 668 )	3 28C4514	5B0829F4	1 073515	5A5B21F4	1 594055
3	( 672 )	1 7 45	5A5B31F4	1 47C15	5E5B45F4	0 074055
4	( 676 )	0 080000	5A5B33F4	1 01145	5A447C5F4	0 164055
5	( 680 )	0 080000	5A5B35F4	1 01145	5A5FFF5F4	0 174055
6	( 684 )	1 01145	5A5B37F4	1 01145	5A5E25F4	0 184055
7	( 688 )	0 080000	5A5B39F4	1 01145	5A5E25F4	0 184055
8	( 692 )	0 080000	5A5B35F4	1 01145	5A5E25F4	0 184055
9	( 696 )	1 538700	FE380JC35	2 4 19C18	8F01105FF	6C059000
10	( 700 )	1 81FA54E	FE380JC35	63547412	9C544863	905B8833C
11	( 704 )	0 080000	5A5B35F4	1 01145	C18F404	0 F2E7C28
12	( 708 )	65579C9	0 080000	5A5B37F4	68C9F414	0 37EB4C
13	( 712 )	54E8E5	5B65F1D9	3 35A7412	C16765E4	0 02E5D04
14	( 716 )	1F1414A	3D743C4B	9 44A1734	557DCE2E	0 01241865
15	( 720 )	0 01241865	958BF66	5A7433	59426654	0 01241865
16	( 724 )	F767454	B7B1494	6 01549D4	6F3F5432	0 01241865
17	( 728 )	52894768	64 15254F	CFF5C	755135627	0 05F94D4
18	( 732 )	4 7C4FD04	6A646550	6417394	6417394	0 05F94D4
19	( 736 )	4 301F4	78 0506A	4 7D1F4	6417394	0 05F94D4
20	( 740 )	0 080000	4 7D1F4	64 05065	5B05F405	0 05F94D4
21	( 744 )	1 7 85	34 0104FF	1 5 9	0 080000	0 05F94D4
22	( 748 )	0 05E2379	F4068805	0 05A47F1	F5C9T7C05	0 05A47F1
23	( 752 )	0 05A5F95	F5060J5	0 05A5BA1	F5U7405	0 05A5F95
24	( 756 )	2 185395	F4068805	1 0 35B91	F3H078C5	0 0445FA9
25	( 760 )	0 024142	4F068805	D4E6A0	FAC07CC5	0 0445FA9
26	( 764 )	0 0640500	0B43BDFA	0 0783530	14 4389FA	0 0640500
27	( 768 )	0 0780500	0B5B80FA	0 0780500	0B5B80FA	0 0780500
28	( 772 )	0 073454	0B5B89FA	0 073454	0A4785FA	0 0780500
29	( 776 )	0 080000	94 05065	1B238DFA	0 073454	0 0780500
30	( 780 )	3 365F5J0	5805905C	3 3861514	68C9F505	0 0780500
31	( 784 )	3 341F5	74 45245A	3 3+5F5	68C9F505	0 0780500
32	( 788 )	3 355F5	68 05805A	3 3599F5	68C9F505	0 0780500
33	( 792 )	0 050000	3 0000000	0 0500000	68C9F505	0 0780500
34	( 796 )	0 050000	0 0500000	0 0500000	68C9F505	0 0780500
35	( 800 )	0 050000	0 0500000	0 0500000	68C9F505	0 0780500
36	( 804 )	0 050000	0 0500000	0 0500000	68C9F505	0 0780500
37	( 808 )	0 050000	0 0500000	0 0500000	68C9F505	0 0780500
38	( 812 )	0 050000	0 0500000	0 0500000	68C9F505	0 0780500
39	( 816 )	0 050000	0 0500000	0 0500000	68C9F505	0 0780500
40						
41	FILE	INPUT	DATA RECORDS	MAX.	READ ERROR SUMMARY	
42		RECS.	INPUT	SIZE	PERM. ZERO B SHORT UNDEF.	INPUT RETRIES
43	2	8776	8777	8192	1	1
44	TOJ	DUMP STOPPED AFTER FILE	2	# OF PERMANENT READ ERRORS		
45	START TIME	W6/14/92	10:21:22	STOP TIME	R6/14/92	10:25:00
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